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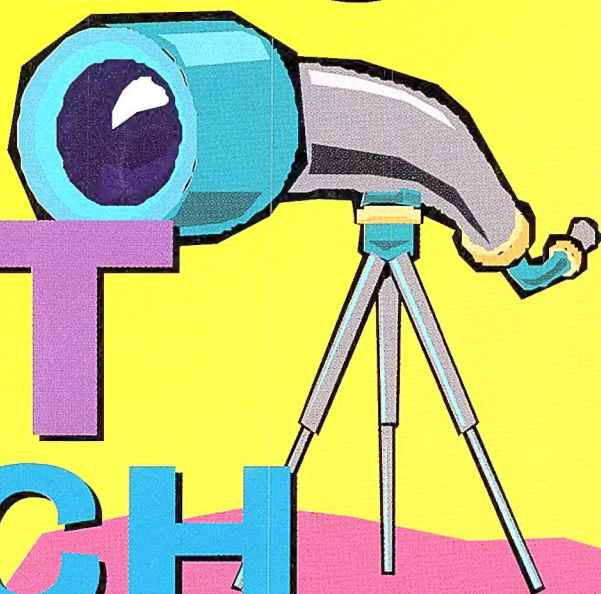
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PINNACLE OF POWER



Pictured with optional 19" Monitor and Altec Lansing ADA-885 Speakers with Subwoofer

The Dell Dimension™ 8100 is the next generation in PCs. Powered by the new Intel® Pentium® 4 processor – delivering speeds of 1.3 to 1.5GHz – it allows record breaking performance on graphics /multimedia intensive tasks and games. This amazing speed and performance won't be threatened by traffic bottlenecks, with the newly engineered Hyper Pipelined Technology and 400MHz System Bus with dual channel RDRAM. All starting from the equally unbelievable price of just \$2799 – which means with Dell™ you get Intel® Pentium® 4 processor power at Intel® Pentium® III processor prices!

DELL DIMENSION™ 8100 DESKTOP

- Intel® Pentium® 4 Processor 1.3GHz
- **UPGRADE TO: Intel® Pentium® 4 Processor 1.4GHz \$399***
- 128MB RDRAM
- 10GB¹ HDD
- 3.5" FDD
- Integrated 3COM 10/100 Ethernet Controller
- 32MB NVIDIA TNT2 M64 4X AGP Graphics Card
- Creative Labs SoundBlaster 64Voice PCI Sound Card
- 48X CD-ROM
- 56K Modem
- Harmon Kardon Stereo Speakers
- 17" Colour Monitor (15.9" v.i.s.)
- Microsoft® Windows® Millennium Edition
- Microsoft® OEM Works Suite 2000
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\$24.35 PER WEEK		
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SUPER MODEL



Dell Inspiron™ 4000 shown with optional colour kit.

The Dell Inspiron™ 4000 gives you a choice of processor speed – up to 850MHz. Its performance is outstanding, the ATI mobility 128 Video with built in 8MB of memory delivers blazing fast 2D and 3D graphics. This is backed by up to 20GB¹ of storage space and expandable to 512MB of SDRAM. The media bay gives you the flexibility you need. Pick an optical device, a second battery, or an internal floppy disk drive. Choose your colour with an optional colour kit. All of this in a slimline 2.36kg package.

DELL INSPIRON™ 4000 G600GT NOTEBOOK

- Mobile Intel® Pentium® III Processor 600MHz featuring Intel® Speedstep™ technology
- 64MB SDRAM
- **UPGRADE TO: 128MB SDRAM \$340***
- 5.0GB¹ HDD
- 24X CD-ROM
- 8MB ATI RAGE MOBILITY-128 2X AGP Video
- High-fidelity Audio SoundBlaster Compatible
- 14.1" XGA TFT Screen (1024x768)
- Microsoft® Windows® Millennium Edition
- Microsoft OEM Works Suite 2000
- Case
- 1-Year Limited Warranty (Next Business Day On-Site² Response With International Coverage³)

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WORKHORSE



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If you're a small business looking to grow, you need an affordable server that will grow with you. And that server is the Dell PowerEdge™ 1400. Not only does it offer up to 144GB¹ of storage, the dual processor capability means you can install an additional Intel® Pentium® III Processor when your business requires it. And since all of our servers are built with scalability in mind, you can just keep on growing.

DELL POWEREDGE™ 1400 SERVER

- Intel® Pentium® III Processor 800MHz (Dual Processor Capable)
- 128MB 133MHz SDRAM With ECC (Upgradeable to 2GB¹)
- 9GB¹ Ultra160 SCSI Hard Drive
- 3.5" 1.44MB Diskette Drive
- Integrated Intel® Pro 100+ NIC
- Integrated Ultra3/LVD SCSI Controller
- 20/48X EIDE CD-ROM Drive
- 3-Year Limited Warranty (With 1-Year Next Business Day On-Site² Service)

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DELL DIMENSION™ L DESKTOP

- Intel® Pentium® III Processor 667MHz
- **UPGRADE TO:** Intel® Pentium® III Processor 800MHz \$99*
- 64MB SDRAM
- 10GB¹ HDD
- Intel® 3D Direct AGP Graphics (Up to 11MB Shared Dynamic Video Memory Technology)
- 48X CD-ROM
- 15" Colour Monitor (13.8" v.i.s.)
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 2000
- Norton Anti-Virus 2000 - OEM
- 3-Years Limited Warranty

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DELL DIMENSION™ 4100 DESKTOP

- Intel® Pentium® III Processor 933MHz
- 64MB SDRAM
- **UPGRADE TO:** 128MB SDRAM \$220*
- 10GB¹ HDD
- **UPGRADE TO:** 20GB¹ HDD \$120*
- 16MB ATI RAGE 128Pro 4X AGP Graphics Card
- 48X CD-ROM
- 15" Colour Monitor (13.8" v.i.s.)
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 2000
- Norton Anti-Virus 2000 - OEM
- 3-Years Limited Warranty

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DELL DIMENSION™ 4100 DESKTOP

- Intel® Pentium® III Processor 866MHz
- 64MB SDRAM
- **UPGRADE TO:** 128MB SDRAM \$220*
- 10GB¹ HDD
- 48X CD-ROM
- **UPGRADE TO:** 20GB¹ HDD \$120*
- 16MB ATI RAGE 128Pro 4X AGP Graphics Card
- Creative Labs SoundBlaster 64Voice PCI Sound Card
- **UPGRADE TO:** 12X DVD ROM \$110*
- 15" Colour Monitor (13.8" v.i.s.)
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 2000/Norton Anti-Virus 2000 - OEM
- 3-Years Limited Warranty

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DELL INSPIRON™ 2000 R500ST NOTEBOOK

- Mobile Intel® Pentium® III Processor 500MHz
- 64MB SDRAM
- 5.0GB¹ HDD
- Integrated 10/100 LAN Card
- 2.5MB Neo Magic
- 24X CD-ROM
- **UPGRADE TO:** 8X DVD ROM \$661*
- High-fidelity Audio SoundBlaster Compatible
- 12.1" SVGA TFT Screen (800x600)
- Microsoft® Windows® 98 Second Edition
- Microsoft OEM Works Suite 2000
- Integrated 56K Modem
- 1 Year Limited Warranty (Next Business Day On-Site² Response with International Coverage³)

FREE ADDITIONAL 64MB SDRAM **VALID JAN 24 - FEB 2**

\$3,499* **\$29.20 PER WEEK**

INCLUDES GST. DELIVERY ADDITIONAL

Please Quote when ordering
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DELL INSPIRON™ 4000 G700GT NOTEBOOK

NEW

- Mobile Intel® Pentium® III Processor 700MHz featuring Intel® SpeedStep™ technology
- 64MB SDRAM
- **UPGRADE TO:** 128MB SDRAM \$340*
- 10GB¹ HDD
- 8MB ATI RAGE MOBILITY-128 2X AGP Video
- High-fidelity Audio SoundBlaster Compatible
- 8X DVD-ROM
- 56K Modem
- 14.1" XGA TFT Screen (1024x768)
- Microsoft® Windows® Millennium Edition
- Microsoft OEM Works Suite 2000
- 1 Year Limited Warranty (Next Business Day On-Site² Response with International Coverage³)

FREE ADDITIONAL 64MB SDRAM **VALID JAN 24 - FEB 2**

\$3,999* **\$33.30 PER WEEK**

INCLUDES GST. DELIVERY ADDITIONAL

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DELL INSPIRON™ 8000 G800VT NOTEBOOK

NEW

- Mobile Intel® Pentium® III Processor 800MHz
- 64MB SDRAM
- 10GB¹ HDD
- 16MB ATI MOBILITY M4, 4X AGP Video
- High-fidelity Audio SoundBlaster Compatible
- 8X DVD-ROM
- 15" Hi-Res SXGA TFT Screen (1400x1050)
- Microsoft® Windows® Millennium Edition
- Microsoft OEM Works Suite 2000
- 56K Modem
- Leather Case
- 3-Year Limited Warranty
- (Next Business Day On-Site² Response With International Coverage³)

FREE ADDITIONAL 128MB SDRAM **VALID JAN 24 - FEB 2**

\$5,999* **\$45.85 PER WEEK**

INCLUDES GST. DELIVERY ADDITIONAL

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DELL POWEREDGE™ 300 SERVER

- Intel® Pentium® III Processor 800MHz (Dual Processor Capable)
- 64MB 100MHz SDRAM With ECC (Upgradeable to 1GB¹)
- 10GB¹ IDE Hard Drive
- Intel® Pro 100+ NIC
- Integrated IDE Controller
- 20/48x EIDE CD-ROM Drive
- 3-Year Limited Warranty (With 1-Year Next Business Day On-Site² Service)

\$1,999* **\$17.40 PER WEEK**

INCLUDES GST. DELIVERY ADDITIONAL

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DELL POWEREDGE™ 2400 SERVER

- Intel® Pentium® III Processor 866MHz (Dual Processor Capable)
- Rack-mount Capable Minitor (Midnight Grey)
- 128MB SDRAM With ECC (Upgradeable to 2GB¹)
- 9GB¹ Ultra160 SCSI Hard Drive
- Integrated Intel® Pro 100+ NIC
- Integrated Ultra2/LVD and Ultra/Narrow SCSI Controllers
- Integrated Single Channel RAID Controller (Optional)
- 17/40X SCSI CD-ROM Drive
- 3-Year Limited Warranty (With 1-Year Next Business Day On-Site² Service)

\$3,809* **\$31.75 PER WEEK**

INCLUDES GST. DELIVERY ADDITIONAL

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DELL PRECISION™ WORKSTATION 330

NEW

- Intel® Pentium® 4 Processor 1.4GHz
- 128MB (2x64) PC600 Non-ECC RDRAM
- FREE UPGRADE TO:** 256MB(2x128) PC600 Non ECC RDRAM
- "DOUBLE YOUR MEMORY FOR FREE" (Subject to a maximum of 256MB free per system)
- 9GB¹ U160M SCSI Hard Drive, 10,000RPM
- Integrated 3Com 10/100 Ethernet Controller
- Integrated Dual ATA-100 EIDE Controller
- 48X Max Variable EIDE CD-ROM Drive
- 17" Colour Monitor (15.9" v.i.s.)
- Microsoft® Windows 2000
- 3-Year Limited Warranty (with 3-Year Next Business Day On-Site² Service)

\$5,499* **\$42.25 PER WEEK**

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OUR THINKING INSIDE THE BOX

ULTIMATE PERFORMANCE

Think of all the things you could ever want in a PC, and put them in a notebook. The new Dell Inspiron™ 8000 offers a level of power and multimedia performance that is truly awe-inspiring. It comes standard with 4X AGP Graphics, and a Hi-Res active/TFT screen.

Crisp, Clean Graphics

Standard with 14" Hi-Res Screen (1400x1050) & 4X AGP Graphics. Screen upgradeable to 15" and video card upgradeable to an amazing 32MB.

Easy Internet Access

Use the access direct buttons for one touch access to the Internet or Dell technical support.

Great Connectivity Option

The internal Antenna can make Wireless Networking a breeze.

Amazing Video Editing Capabilities

Integrated Firewire port for hot-pluggable high speed data transfer. Lets you easily download and edit digital videos and photos.

Great Looks

Optional Colour 'snap-on' kit for palm rests. Choose from Storm Grey, Tahoe Blue, Purple, or Yellow.

Ultimate Personalisation

Two media bays plus one fixed bay means that you can configure your system in numerous ways. The fixed bay supports a CDROM, a DVD or a CDRW. The configurable media bay supports a CDROM, a DVD, CDRW, second battery, a zip drive or a floppy drive. How will you configure yours?

Dell Inspiron™ 8000 shown with optional colour kit.

Dell recommends Windows® 2000 Professional for business.

DELL INSPIRON™ 8000 G700VT NOTEBOOK

- Mobile Intel® Pentium® III Processor 700MHz
- 64MB SDRAM
- 5.0GB¹ HDD
- 8MB ATI MOBILITY M4, 4X AGP Video
- High-fidelity Audio SoundBlaster Compatible
- 8X DVD-ROM
- 15" Hi-Res SXGA Screen (1400x1050)
- Microsoft® Windows® Millennium Edition
- Microsoft™ OEM Works Suite 2000
- 56K Modem
- Case
- 3-Year Limited Warranty (Next Business Day On-Site² Response With International Coverage³)

FREE ADDITIONAL 128MB SDRAM
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\$4,799*

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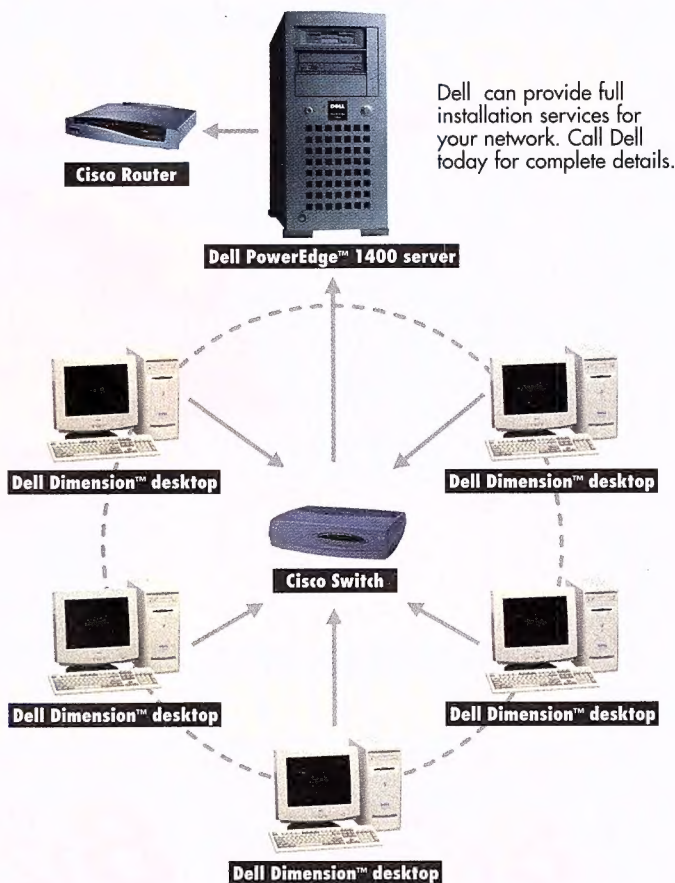
OUR THINKING OUTSIDE THE BOX

NETWORK YOUR BUSINESS AND GET ONLINE FOR LESS THAN \$2820 PER PERSON

- Keep your business open days, nights, weekends
- Provide safe, secure Internet access
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Dell can help you run your business 24 hours a day, 365 days a year to ensure your business is never closed – giving you greater customer exposure and keeping you one step ahead of your competitors.

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DELL'S INTERNET SOLUTION FOR SMALL BUSINESS

- PowerEdge™ 1400 Server with Intel® Pentium® III Processor 800MHz, 128MB SDRAM, 9GB Ultra 160 SCSI Hard Drive
- 5 x Dell Dimension™ L667 Network Managed PCs with 15" Monitors (13.8" v.i.s.)
- Cisco 1548U 8 Port Switch
- Cisco 800 Series Router with IP Firewall Software
- Dell Installation (Additional charges may be required based on each on-site assessment. Call Dell today for complete details.)

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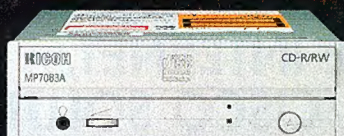
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88 XCDR Writing
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32 X Reading



MP7083A

81210 XDVD
XCDR Writing
XCD-RW Writing
32 X Reading



MP9120A
JustLink



Ricoh Platinum
CD-R media



PC Computing
5-Star Rating



PC Magazine



April 2000



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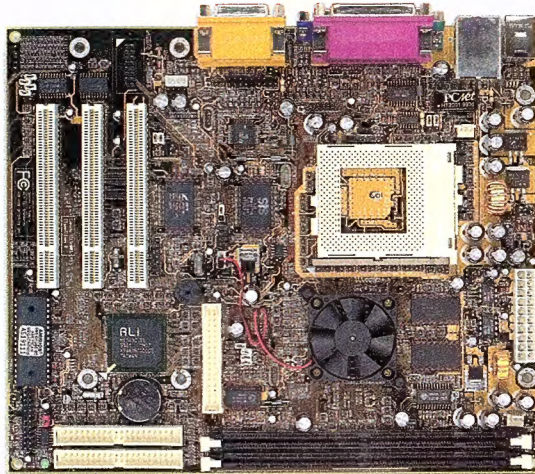
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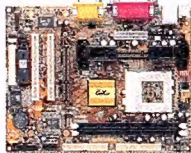
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FC-PGA/PPGA**

**TNT2
Graphics**

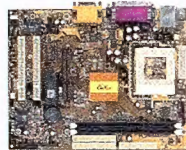
**3D 4-Channel
Sound**

**56k
Modem**

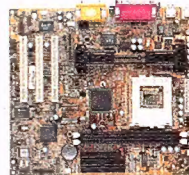
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LAN**



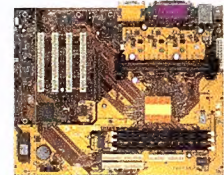
M756LMRT



M758LMR



M770LMRT



M800LMR

The barebone system including:

- Ultra slim case W/MATX Power
- Intel Chipset
- 3D Graphics Accelerator
- 3D 4-Channel Sound
- DVD ROM or 52x CD ROM
- 1.44 Mb FDD
- V.90 56k Modem
- 10/100 Mbps LAN
- TV Output
- 2x USB ports, 2 PS/2 Ports



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PERTH
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The 1 Gigahertz AMD Athlon Processor Now available

Ziff-Davis Winbench 99 FPU Winmark

AMD Athlon	1000MHz	5440.0
AMD Athlon	900MHz	4910.0
AMD Athlon	800MHz	4360.0
Pentium III	800MHz	4233.3

0 1000 2000 3000 4000 5000 6000

-Davis 3D Winbench 99 v 1.2 (Null Driver) Microsoft Win 98

AMD Athlon	1000MHz	5353.0
AMD Athlon	900MHz	5010.0
AMD Athlon	800MHz	4684.0
Pentium III	800MHz	4073.3

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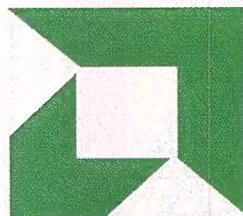
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AMD



Duron™

PROCESSOR



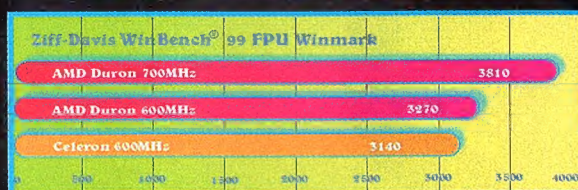
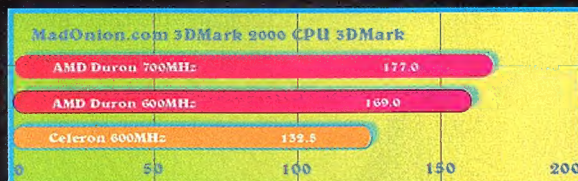
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LAB TESTS

62 A few Good Pointers

The RMIT IT Test Lab looks at the latest crop of mouse and trackball input devices to find which is really the best for pointing and clicking.

COVER STORY

70 In Search Of...

The information you want is most likely out there on the Web. Who'll find it best and fastest? We test 30 general-purpose search engines and find that the best aren't always the ones that index the most pages.

LAB TESTS

90 Making Sense of Motherboards

In part one of our comparison, the RMIT IT Test Lab compares the latest Intel-based motherboards to help you decide which is the ideal one for you.



Competition

PC Magazine Australia is giving one lucky reader the chance to win Australia's Fastest Intel Pentium 4 PC. The winner will be announced in the May 2001 issue. To be in the running, tell us how you would use this high-performance PC. Page 108

KEY PRODUCTS COMPARED IN THIS ISSUE

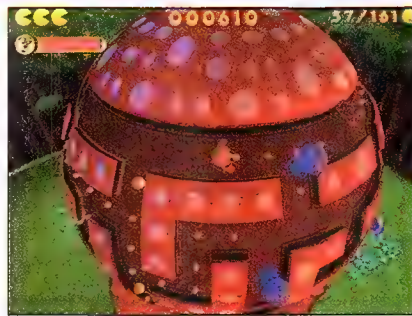
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Broadcast News

There aren't many things I personally get to be excited about in the realm of broadcasting to the home. I've used this column more than once to lament the fact that, though I live minutes from the centre of the city, I'm one of

those unfortunate individuals not able to get access to cable. And satellite installation to the block of units I live in is still way too expensive.

On the Internet side, I have the comfort of knowing that I'm in an ADSL accessible area (of course, it would be a *bit* more comforting if connections were actually being installed).

But as of the first of the year, that's all changed. I now have access to digital television. I've got nothing capable of receiving those signals, mind you, but they're there—coursing through my aerial lines, urging me to buy the first digital television off the factory floor.

The interim solution, until those televisions become available mid-year, is the Thomson set-top box, which receives the signals and converts them for display on standard analogue televisions. Or, it *would* be an interim solution if the first ones shipped to Australia had actually worked. A small software glitch was found to be the problem in that first batch, and working units should be available by the time you read this.

This shaky start was made even shakier when the Australian Broadcast Authority stirred up the media by talking about "interference" from digital signals, and setting up hotlines for people experiencing interference problems with their analogue broadcasts.

The only difficulties that were reported, however, were found to be "caused by broadcasters upgrading their transmission facilities, rather than because of new digital transmissions", according

to Professor David Flint of the ABA.

In spite of all this hubbub, this is exciting news—one of those occasions where we get to revel in the fact of being on the cutting edge. And with the improvements I've seen watching DVDs, I'm expecting to see big improvements in television picture quality (and let's not forget the

*Here's the real kicker
for digital TV: the promise
of interactivity.*

improvements in sound quality either).

And then there's the real kicker: the promise of interactivity. Imagine sporting events where viewers are offered the choice of different camera angles, action replays, player profiles, and loads of other information.

This is happening—and soon. Imagine having access to more information related to the program you're viewing: product information, in-depth news reports, and even travel-related facts.

Then there's "datacasting", where broadcasters are allowed to deliver additional information with their programming as long as they stay within some pretty vague guidelines setting down what content is "acceptable".

So it's a matter of getting a Thomson box, or sitting around waiting for the next-generation TVs to appear. But those are just not enough options. Where are the digital equivalents of PC tuner cards so we can bring all this content to the computer? It seems like the perfect opportunity.



Brian Haverty

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A REAL FIRST

Just thought I'd point out a slight error in your article titled "A Surefire CD Burner" in the November 2000 issue of *PC Magazine Australia* which states that the Plextor PlexWriter is the first 10X rewritable drive on the market. I believe this to be incorrect as I have owned a Ricoh MP7120A rewriter for nearly two months before reading the article (and although it doesn't have such an advanced feature like BURN-proof, it is capable of the exact same speeds [12x10x32] as the PlexWriter).

CHRIS MILLS

VIA THE INTERNET

IT'S HER REAL SURNAME

Regarding Jan Pinyon's letter, "Buyer Beware" [We've Got Mail, November 2000], she is utterly correct. Being female and over 40 I am treated worse than a child. At least a child will have things explained to them.

I went to, or rang, eight shops before I found a techie who was civil and I have since spent thousands in that store (two work and one home computer). That techie has now left the store and I have to deal with a female person who thinks she knows everything (she doesn't).

I can pull a PC apart, put it back together, load new software, change registry settings and a myriad of other problems are easy to fix, so why is it so hard to ask a shop assistant for assistance?

DEBBIE BRAGG

VIA THE INTERNET

IT'S ALL A CROC

After reading the "Get your Graphics up to Speed" article in the December 2000 issue, I would like to pass on the following tip. How many people started their 3D gaming with the venerable Voodoo cards, but with their latest upgrade have been forced to "go with the flow" and buy a TNT2 or GeForce, only to render (pun intended) a couple of their favourite games unplayable because it was either written solely for the Glide API, or only offered Glide and Software acceleration? Games such as Croc and Gex come to mind in our house—they

were left on the shelf as unplayable the day the new computer arrived.

Well, there is an answer: 3Dfx emulation. Numerous versions of software known as a "Glidewrapper" (available on the Internet) will allow many of the older Glide games to run really nicely on a modern machine (later than a PII 400MHz with a TNT2). Sure it won't run Quake 2, but why would you when OpenGL is the API of choice? But for games like Croc, it produces far better results than software acceleration. You might get a few odd artefacts, but overall the results are pleasing.

A suggested Web site is www.zophar.net/utilities/glidewrapper.html.

LLOYD ADAMS

VIA THE INTERNET

MORE GRAPHICS TROUBLES

More and more today we keep hearing about the goal of user-friendly computers. There are so many catchy slogans like "intuitive user interface", "on the Net in 10 minutes", and "so easy a child could do it", not to mention technology like USB, plug and play, self repairing OS, etc. Yet the truly user friendly area of computing, Customer Service seems to be totally passed over. In fact, today the lack of service begins before you even buy anything. A recent case in point was my latest purchase whose advertisements border on fraud.

I just bought a new graphics card based on the nVidia GeForce2 MX GPU. The main reason for this card was to replace an old TNT2

based card with a much faster card that supported a transform and lighting engine, DVD hardware motion compensation, and the much talked about Twin View option of connecting two simultaneous monitors to the one card. Now both the card vendors and nVidia Web sites talk about this and more, including fill rates, high speed SDRAM and driver support for both Windows 9X/2000 and NT4.

Here's what they don't

tell you. The driver support is not complete across operating systems. Now I could understand this for the older OSes but not the new ones. I have so far been unable to get Twin View to work under Windows 2000, I see the tab option but nothing works. I have sent e-mails to both nVidia and the card manufacture asking if Twin View works with Win 2000 but as yet no reply. To make matters worse no

Web site, fact sheet, or sales brochure has any mention of whether it does or doesn't work. In case you are wondering, it is not a hardware problem. My system is dual boot to both Win 98 and Win 2000 and the Twin View works fine under 98. The problem is that I only use 98 for games and my parallel port scanner because Epson said that it is not possible to use a bi-directional parallel port scanner under NT4/2000.

The other main reason for purchasing



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this card was for DVD playback. The hardware motion compensation can increase DVD Video playback performance by up to 30 percent. What you are not told is that the included playback software, PowerDVD, and the GeForce2 MX drivers do not support motion compensation under Windows 2000. And yes again it does work fine under Win 98.

Now don't get me wrong, this is a very fast and cheap graphics card. My games and 3D graphic applications have never been so fast or smooth. However, given that I am using a modern OS, with modern hardware that said nothing about the fact that half of its major features wouldn't work, I expected a much higher level of user friendly customer service.

ANTHONY GIBBS

VIA THE INTERNET

HISTORY LESSONS

When using Internet Explorer 4.01 I notice that when I go into File Open and start entering an address the system often loads an address I have previously referenced just after I start typing. I am assuming that these addresses are held in a file somewhere and I can edit or delete them. Can you tell me what that file is and how I can delete entries from it?

ROGER MARSTON

VIA THE INTERNET

See the next letter.

—Editor

HISTORY, PART 2

On page 148 of *PC Magazine Australia*, September 2000, Greg Dundorf asks how

to edit the history list. Now, I followed the instructions you gave but the addresses will not delete. I can delete addresses which I have used that day but when I go to search and get a list of old addresses, I right click on them, then click delete then it asks me if I am sure and I click yes and nothing happens, the addresses remain.

ALAN COITO

VIA THE INTERNET

*"The effort required
to get online
is not explained
well enough for SMEs
and can produce a
negative experience."*

Mr Dundorf was told to click on the History toolbar button to open the History panel. Then, addresses or folders can be right-clicked and deleted. Deleted pages should no longer appear in the Address Bar's AutoComplete list. We confirmed that this method works with IE history lists.

—Editor

E-MERCHANT TECHNOLOGIES

Having been given the task of evaluating the option of "e-commerce" our Internet site so as to be able to sell our

products over the Internet, I was surprised that your article on Do It Yourself Web sites [October 2000] didn't mention anything about the other aspect that requires the same, if not more, attention—the establishment of merchant accounts. I have contacted most of the major banks, online as well as over the phone, attempting to wade through the varying costs associated with establishing merchant accounts. The costs for setting up a merchant account are, by and large, great.

Initial set up fees, monthly fees, per transaction fees, service fees, establishment fees, annual fees were all quoted, amounting to more substantial costs that adds onto the already growing amount of money needed to create the online shop.

As well as the above fees associated with the merchant account, some banks insisted on taking over all of our account keeping and payroll services, something that we feel was not necessary as our current credit union does this already.

As the "e-commerce" buzzword grabs the attention of SMEs, you should now follow up on the article with a breakdown of merchant services provided by banks and building societies and make them aware of the possible growing strain on their finances that are required to get them selling on the Internet. In my limited experience (regarding e-commerce), the costs and effort required to get online and e-commerce-enabled is not explained well enough for these SMEs and can, in the long term, produce a negative experience, which may reflect back on the industry.

COLIN BROKENSHIRE

VIA THE INTERNET

Letters Competition

Well, it's time to choose the first Letter of the Month for 2001—the New Millenn . . . oh, let's not get into that.

Last month we gave a Packard Bell PC from Harvey Norman to the winner of the Letter of the Year, so remember that winners (and others) from here on out will also be in the running for another big prize at the end of the year.

This month, we had a few interesting letters on graphics cards. And the mail confirming the details of how to remove AutoComplete addresses from Internet

Explorer's History list highlight a problem that a lot of readers seem to face.

But the letter we choose as this month's winner is Colin Brokenshire's missive on e-commerce and the importance of finding the right merchant banking solution.

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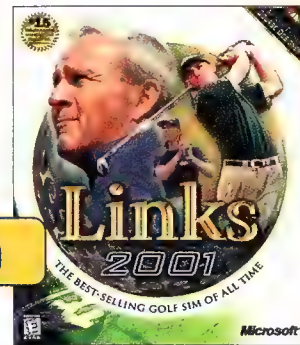
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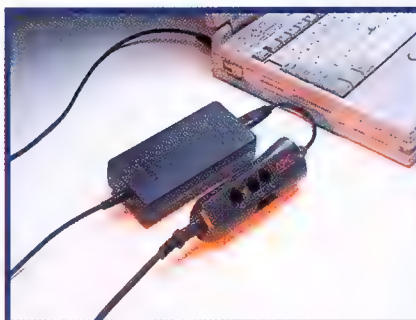
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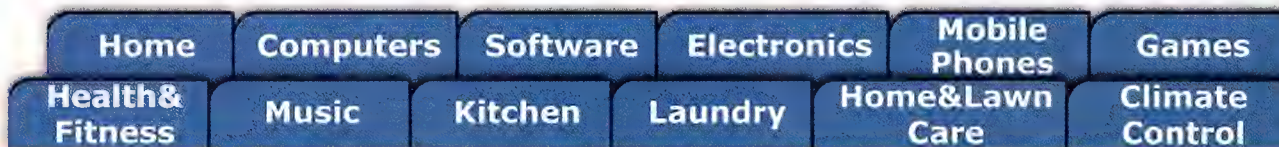
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Steer Clear of Scare-Mail

Hypodermic needles in phone booths? Toxins in Canola oil? Carcinogenic shampoo? If we believed everything we were sent via e-mail, we'd have panic attacks before getting out of bed every morning.

We all know what these e-mails are like,

because we've all received them. Personally, I find them the worst kind of spam. Why? Because it's the type that preys on the unsuspecting. It taps into people's fears and insecurities. Take, for example, the well-known (and well-circulated) e-mail about underarm deodorant and its potential to cause breast cancer. "Rubbish", I thought when I first read the subject line. But then I start wondering. I open the e-mail, thinking I'll read only the first paragraph. It is written as a personal letter from a woman who contracted the disease (by using anti-perspirant, it seems). It talks about toxins building up in the lymph nodes, quotes stats about the disease, and includes information from what sound like reputable sources. It all sounds frighteningly feasible. In the final paragraph it pleads that you help other women you care about—by sending the e-mail on to them.

Even though I chose to ignore the e-mail, I couldn't help but wonder if it had some basis in reality. I thought about it a few times during the day, then I finally caved in—I sent the e-mail on to my girlfriends and female relatives. I have since learned that the e-mail was false. Nothing but a silly scare-mail. The temptation to read, believe, and pass it on was too great and I unwillingly became part of the scare-mail-spreading problem.

Mail of this kind is as bad as a virus. The Internet has made information accessible in a way that it has never been before, but it also provides a way for people to spread misinformation. On the Internet, one person's personal belief can be disguised to look like the opinion of many, and via e-mail, it can spread faster than ever before—especially if you forward it to all your friends.

Unfortunately, these annoying e-mails are much harder to avoid than other spam because they're not easy to filter. Most spam can be trashed without the need to see it. You simply need to establish the sender of the spam, or some key words likely to pop up (such as xxx), and send the e-mails straight to the Trash fold-

er. The problem with these scare-mails is that most come from well-meaning friends who want to warn you about potentially dangerous situations (real or imagined)—you can't just junk all their messages!

Apart from the worry such e-mail can cause individuals, it represents a huge waste of both time and bandwidth. Even if recipients spend only five minutes reading each message—it still amounts to a great waste of company time.

And think of the huge number of inboxes being assaulted unnecessarily as the number of recipients grows exponentially!

*Via e-mail, misinformation
can spread faster than ever before.*

Is there anything that we can do to stop the onslaught? Well, maybe we can't stop it, but there are definitely things we can all do to stem the flow. As an individual, we can start by avoiding the temptation to forward these types of e-mail. I now view any e-mail asking to be forwarded as suspicious. If you are concerned about whether the information in a particular message is real or not, check out www.urbanmyths.com. The site lists hundreds of myths spread over the Internet. It de-bunks some, verifies others and even asks for your help solving tough e-mail mysteries.

Considering that most people use e-mail primarily at work, companies can certainly help contain the number of silly e-mails circulated by taking responsibility for their employees' mailing habits. If your company doesn't have a policy regarding e-mail, one should be drawn up. It is important for staff to have access to e-mail, but unrestricted use could cause all sorts of problems. Staff need to be told what constitutes appropriate and inappropriate use of e-mail, a written policy outlining proper and improper use can make a world of difference.



Anna Raciti

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More Microsoft Madness

Microsoft is a company that must continue to grow in every way to meet shareholder expectations and, like a shark, move forward to keep itself alive. The company is not about to change its ways just because a potential breakup by the US Justice

Department edict is hanging over its head. So it's trying to tackle three monster markets. Its success is doubtful—but possible.

Playing Games

Here comes the Microsoft Xbox, which the company is going to sink millions into to promote as the latest competitor in the game console world. Watching this scenario unfold is interesting, since it seems to parallel the development of the first IBM PC. The game folks were left alone in a skunk works environment, similar to the Boca Raton segregation given to the IBM PC folks in the early 1980s, and weren't bothered by the same corporate meddling that has sidetracked many good ideas at Microsoft.

Xbox marketing already shows indications of being phenomenal. For example, without one Xbox on the street, gamers are saying that this will be the machine to compete with the Sony Playstation 2. Sheesh, without one machine being sold!

Microsoft has been squeamish when profit models don't match those that the company is comfortable with in its software and software-licensing business. Microsoft's botched attack on AOL—when it held a large stake of UUNET but didn't see any future in becoming a competitive ISP—is a perfect example.

This screwup was largely dictated by Microsoft's failure to understand the profit model of the ISP world. Thus blinded, Microsoft left AOL to grow into the world's biggest ISP. That same executive skittishness can hurt the Xbox.

Furthermore, Microsoft has always avoided deep forays into hardware, and this Xbox development looks like something the company will quickly license to Matsushita or some other lucky Japanese company. In fact, the Xbox strategy is somewhat flawed, since it's ignoring numerous market trends, including the full integra-

tion of a PC, game console, and DVD player into a single box at a low price.

The idea is that for not much more money, you can turn any DVD player into a game machine and computer and sell it as an advanced DVD player in parts of the world where the public cannot afford to have three separate devices.

The decision not to put Windows on the Xbox makes sense. If the loss-leader Xbox is designed to gener-

*Without one Xbox on the street
gamers are saying this will be the machine
to compete with the Playstation 2.*

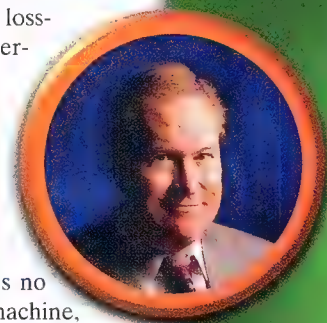
ate profits by selling games, then there's no reason to make it into a Windows machine, which may be purchased and used only as a computer.

But this creates another odd dilemma: because the machine has a normal computer subsystem, including a hard drive, very little effort would be needed for hackers to find a boot ROM or some aspect of the machine that would turn it into a cheap Linux box with a little reprogramming. I suspect that the Xbox, once it arrives, will become the most hacked and modified computer in history, much to Microsoft's dismay.

Then There's the Set-Top Box

Microsoft still has its eyes on the set-top box business, fearing that there will be a revolution as predicted. Of course, we've seen how the TV and cable folk have been promising for years to create a revolution in television by making it more interactive and usable. To me, the kind of smart folk who would like a more powerful TV system are the same ones who don't have that much time to waste watching TV. All the set-top box pitches I've seen just make things too complicated for the average user, who simply wants to turn to a channel and sit down.

PC



John C. Dvorak

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On the back of a year that saw sales double, Hitachi CRT monitor sales have increased another 300%*. Why the massive growth? Is it the comprehensive range? Is it the leading technology or superior quality? Is it the extensive testing which breeds reliability? Maybe it's the value for money – it must be the price. Curious? See for yourself why they really are the prize catch, call 1800 789 799 or visit www.hitachi.com.au

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Can Microsoft Hijack the Web?

A lot of people in the computing world—too many—see Microsoft as the Evil Empire. Maybe it's just that every industry needs its designated villain, but I can't think of many situations analogous to Microsoft's in other businesses—pharmaceutical, automotive,

consumer electronics, whatever.

Then again, none of those industries has a company that has dominated it as Microsoft has computing, or one that has tossed so many thoughtless, arrogant barbs at its customers, competitors, regulators, the press, and others.

Right now we're seeing the rise of a new wave of Microsoft bashing, based on the company's July announcement of its new .NET initiative. This is a huge project, with what Microsoft hopes will be an immense impact: it sees .NET as the glue that will hold the "Next Net" together.

Fuelling the Fire

Netizens are famously protective of their world, and that kind of hubris coming from Microsoft—the company they love to hate—pushed all sorts of hot buttons. Just as Microsoft tried to hijack the Web with Internet Explorer and the runtime Java-machine world, the story goes, now it's trying to hijack the emerging, much more useful Web by turning the Internet into a Microsoft satrapy.

"Enough!" they cry. "This time Microsoft must be stopped, at all costs."

I say: "Oh, shut up." First, because what Microsoft's trying to do is very, very difficult, and it may not succeed, at least not for years. Second, because even if the Microsoft folks do make everything work, it's extremely unlikely that they'll ever be able to dominate the new Web environment anywhere near the way they've dominated the PC operating-systems market. And third, because that kind of paranoid ranting actually helps Microsoft by giving credibility to the improbable idea that Microsoft will pull this off quickly and easily. That outcome is foreordained by a blizzard of Microsoft press releases.

Microsoft will deliver .NET as a series of servers and is revamping everything—including the Microsoft Office megolith—around .NET's schema of "everything connects to everything; everything works with everything."

I don't think anyone's going to be in a position to judge the effectiveness of .NET—the quality of its architecture, the quality of Microsoft's execution, its market acceptance—for at least another couple of years. I've seen

pieces of .NET in its present, very tentative form, and I'm seriously impressed. But will the shrink-wrapped stuff—if, indeed, anything's still being delivered in shrink-wrap—be that good when it's finally available? I'm not betting on it.

More difficult, probably, is the question of whether Microsoft will be able to dominate the market with .NET products and .NET standards. I doubt that.

.NET will be an important standard, but by the time it comes to market, there will be other strong Web integration tools available as well. All of them will have to work with one another, and with

Microsoft may well be a leader with .NET, but it's going to be neither alone nor unchallenged.

our data and devices, to survive. Microsoft may well be a leader with .NET, but it's going to be neither alone nor unchallenged. It will have to play well with others.

Our screaming about Microsoft's arrogance and our assumption that this is the end of an unfettered Web give the notion of Microsoft hegemony over any market it enters unwarranted credibility. Sure, it's good; but it's not omnipotent.

Microsoft Gets It

Finally, kudos to Microsoft for one very good decision: basing .NET on XML. Real, standard XML. Not XML++ or XML-Z or some other Redmond variation. Microsoft execs in charge of the .NET effort assure me that won't change; there won't be a shift over time toward a proprietary, tweaked XML, which would just happen to freeze out everyone not running Windows on his or her client device.

Dare I say that Microsoft finally gets it on the importance of supporting open standards? Nah, I can't say that with a straight face—yet. But maybe. And in a time when everyone is cooking up nonstandard/extended XMLs, frankly, we could use some open-standards leadership from a gorilla like Microsoft.

PG

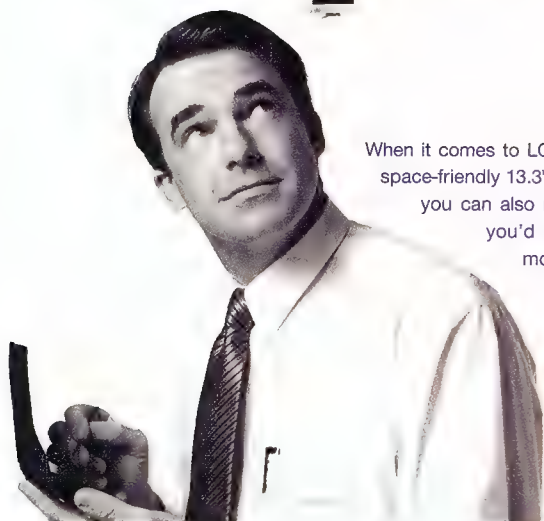


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Equal Access for All

Have you made life more difficult for anyone today? If you've put up a Web site recently, chances are that you have. While people with disabilities have been empowered by technology, when you use the new techniques for site building, navi-

gation, and creating exciting visuals, you may inadvertently disenfranchise some users. The unique user interfaces you're creating may render the content inaccessible to those with any perceptual or motor impairment.

Key aspects of accessibility—easy use with assistive interfaces or devices—fly in the face of popular Web design tenets. Commercial sites

increasingly use Flash and other animations to catch your eye and draw you in. Fat lot of good it does you if you're blind or suffering from a vision impairment. I see sites all the time with critical information—either navigation or headline text—buried in bitmaps. Unless you provide extensive alternative text in the HTML or build a non-graphical shadow version of your site, it may be impossible for some people to use.

The World Wide Web Consortium (W3C) has standing and draft standards for browsers, Web sites, and applications such as media players, that outline and encourage the development of universally usable interfaces. The Web would be a better, more useful, more navigable place if everyone adhered to the recommended standards. (Check them out at www.w3.org, and take a look at the current work-in-progress accessibility spec at www.w3.org/wai/ua/wd-uaag10-imp-20001101.)

When software development was firmly in the hands of the programming priesthood, it was easier to maintain standards. Today the OS provides the basic hooks and tools for accessibility, but a badly designed application can utterly block their use. Web sites are no exception.

As Microsoft has become the dominant operating-system and browser provider, it has had to pick up considerable responsibility for accessibility features. See www.microsoft.com/enable for the highest-level view. It took Windows and many Windows programs a long time to become access-aware, and they still leave something to be desired. The next version of Windows, for example, code-named Whistler, will have much greater integration between the operating system and the Internet Explorer browser. Not everyone is leaping for joy at this prospect.

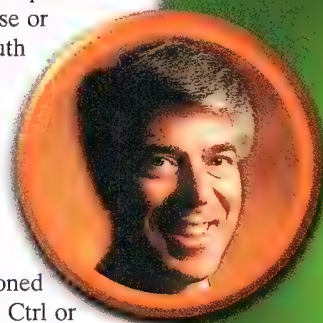
People with mobility or dexterity limitations tend to

rank IE dead last, behind Opera and Netscape Navigator, because it's difficult to drive the browser from the keyboard. Many users vastly prefer using keyboard commands to the mouse, especially on a laptop, where the mouse is replaced by a generally inferior pointing device. I prefer keyboard shortcuts to driving the menu from the Alt key, and Netscape has more convenient shortcuts than IE. But Opera, which has only a tiny fraction of the browser

market, has by far the richest selection of shortcuts.

Most shortcuts involve holding one key and pressing another—a problem for one-handed use or for people who use a head wand or mouth

I see sites all the time with critical information buried in bitmaps.



stick. Over 18 years ago a reader mentioned using a small bag of lead shot to hold the Ctrl or Alt key down while he pressed a shortcut key. We had a better idea and wrote a little utility that would switch the Ctrl and Alt keys to toggle mode—press on, press off. It eventually became part of the operating system.

Any application that doesn't generally require you to enter data can also have one-button commands. Browsers, except when you're entering text into form fields, are an obvious choice. When you open additional browser windows in Opera, they all live within Opera's main screen. Instead of Alt-Tabbing among them, as you would with IE or Netscape, you simply press 1, 2, 3, and so on to choose the window you want.

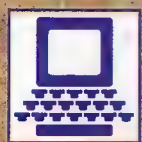
I value Opera's simplicity, the leanness of its code, its thoughtful user interface, and even the completeness of its default bookmark file. It's worth every penny of the registration/purchase price.

But even a perfect browser can't overcome a badly designed site. Using some of the resources above and a little common sense, you can ensure that the sites you build are usable by everyone. Remember, one person in five has a visual or physical impairment, and full enablement is a temporary condition.

PC

Bill Machrone

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Worst PC Sales Ever

New PC sales are down, according to research, but it's not all bad news.

For the first time ever, worldwide unit sales of PCs through store, catalogue and online retailers fell in 2000 compared with 1999, according to market researcher PC Data.

For December, retail PC sales plummeted 24 percent in what conservatively is being called the worst holiday PC sales season on record.

"The real story here is that it's a mature market—suddenly, overnight, in the last half of last year," said PC Data analyst Stephen Baker. "All the easy pickings went away, and the compelling upgrade reasons are not there right now."

In December, retail PC revenue fell 30 percent to US\$855 million, compared with the same month last year, according to PC Data. Selling prices are expected to drop in January as PC makers look to unload a backlog of inventory, estimated to be nearly twice

normal levels, according to dealer and distributor sources.

PC Data reported just under 2.5 million unit sales for the fourth quarter, down 18 percent from a year earlier.

But PC Data offered some glimmer of hope to retailers and PC makers battered by dismal holiday sales. While PCs sold poorly, consumers spent generously on other high-tech gadgets, such as handhelds and MP3 players, as well as peripherals connected to computers.

Citing November sales data, Baker pointed out that MP3 sales rose 400 percent from a year earlier, while PC cameras gained 68 percent, CD-rewritable drives 65 percent and digital cameras 26 percent. Handheld devices, such as Palm and those running on the Pocket PC platform, more than doubled sales in November year over year, he added.

For this reason, Baker pre-

dicted most computer retailers would see fourth-quarter revenue rise in the range of 10 percent to 12 percent.

For PC makers, the task at hand now is to shift their focus and marketing strategies, from getting lots of new customers to catering more to the existing ones. Many PC makers overestimated fourth-quarter and holiday sales because they failed to see that the market had shifted from growth to replacement, Baker said.

While consumers and businesses may no longer drive double-digit PC market growth, there are still plenty of sales prospects, particularly if companies focus on upgrades. "If you look out into the future, you can see a couple compelling things that are going to get current customers to upgrade," Baker said.

But those upgrades will be driven in part by what did sell well during the holiday season:

handhelds, gadgets and peripherals. "The compelling reason to upgrade a PC is the stuff coming into it," Baker said. Broadband and DVD-recordable drives could be the two biggest propellers of consumer PC upgrades, provided the technologies can expand as expected.

But without these and other technologies feeding upgrades, PC makers face a difficult sales climate. "The value proposition for the PC doesn't just lie in the PC," Baker explained. "It lies in the utility of the PC as part of the home or business technology outlook."

There is money to be made in tending to existing customers, a market that Baker said is better in many ways than the old one. "Even if you get only a small percentage of people to upgrade, you've got such a huge installed base now that's still a significant number." —Joe Wilcox

ANTI-VIRUS

The Worst of 2000

The Kakworm virus did more damage than any virus in 2000, affecting 17 percent of computers last year. So says Sophos, an antiviral solutions company, in a recently released list of the top 10 viruses for 2000. There was no month last year in which the Kakworm virus, which exploits security vulnerabilities in Microsoft Internet Explorer and Microsoft Outlook, ever dropped out of the list of

the three most common viruses. Microsoft's release of a patch that thwarts the virus has done little to stem the tide of continuing infections, primarily because few users have downloaded the fix.

Despite all the hoopla surrounding it, last year's Love Bug virus didn't have staying power, and came in second on Sophos' list. Rounding out Sophos' top five in 2000 were viruses dubbed Apology-B,

Marker, and Pretty. Together, these five accounted for 51 percent of all calls placed to Sophos last year.

You can drastically reduce your vulnerability to viruses by following a few simple procedures, according to many antivirus experts.

First, make sure any antivirus software contains up-to-date virus definitions. Many people think that just having anti-virus software is enough, but Patrick Martin, Program Manager for Symantec's Antivirus Research Centre,

says individuals should periodically make sure that their virus definitions are up to date. He adds, "this alone would drastically reduce the number of infections."

Next, use the same caution opening your e-mail as you do opening your front door. Many viruses these days masquerade as vanity messages ("I love you", "I'm sorry", and so forth) or harmless downloads with cute appeal. You should treat all messages as potentially harmful.

—Walaika Haskins

INTERNET

Make-up Online

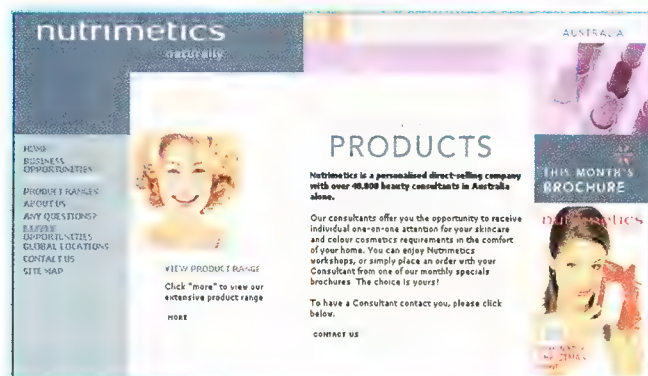
Nutrimetics' skincare and colour cosmetics products are sold by over 46,000 consultants in Australia and 250,000 agents worldwide. And recently Nutrimetics International along with Com Tech Communications developed its online presence through two Web sites.

The Nutrimetics public Web site, at www.nutrimetics.com.au, was designed for marketing purposes. Coen Vleesenbeek, Business Development Manager of Nutrimetics Australia, said the system is expected to streamline the volume of calls and faxes to the customer service call centre at Nutrimetics. He also believes the Web site will give consumers the power to answer their own questions and feel more comfortable making their purchasing choices.

The second site will be used specifically by Nutrimetics consultants to place orders and generate reports online. This B2B will be launched by the end of January and will provide an online gateway where consultants can gather information and use the site as a selling tool.

Nutrimetics products are not available through retail stores or online, however the new Web sites aim to improve the consumer's awareness and knowledge of the products available, as well as improve customer service through effective communication with its consultants.

"Now that Com Tech has assisted us in developing and designing our online presence, Nutrimetics can offer product information, an insight into the company's history and information on the business



opportunities available within such a successful organiza-

tion," said Vleesenbeek.

—Rosina Di Marzo

DATABASES

Mobile Database

FileMaker has announced FileMaker Mobile Companion for the Palm OS, an easy-to-use add-on companion to FileMaker Pro 5v3.

Designed for individual users working in non-shared databases, the FileMaker Mobile is aimed at corporate work groups, professionals in small and medium-sized business settings, home office users and developers of custom solutions and Web-publishing applications.

FileMaker Mobile is ready-to-use with existing FileMaker Pro databases. Fields and data can be installed on the handheld from an existing FileMaker Pro 5 database.

FileMaker Mobile is de-

signed on a simple load-and-go mobile user model. You select and load the FileMaker data required from your desktop to the Palm OS handheld. Later, the data on the handheld may be re-synched via the Palm HotSync technology with the individual's single-user FileMaker Pro database on the desktop computer.

Users are able to create reports, and exchange data with Microsoft Office products such as Excel and Word.

A few of the FileMaker Mobile's functions include the ability to customise personal contact lists, track personal projects, create to-do lists, as well as maintaining categorised lists of collections or items.

Consultants or legal professionals can track billable hours, while managers can maintain employee information files.

The download rate for the 80KB FileMaker Mobile is 10 seconds from PC to Palm and some 30 seconds from Palm to PC, depending of course on the speed of the processor.

—Maria Soranidis

MODEMS

DSL in the Lead

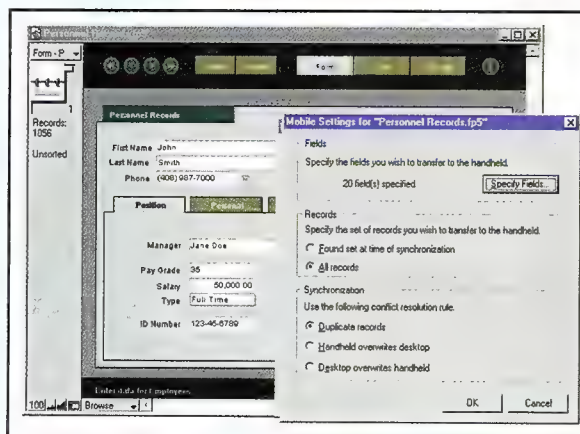
The year 2001 will be the year of the DSL modem, according to a new report by IDC. The report, *The Internet Just Got Faster*, says DSL access in Australia is expected to grow at a five year compound annual growth rate of 350 percent. The figures point to 2.1 million DSL subscribers by the year 2004.

"Strong uptake is predicted to occur in 2001 as the competitive landscape increases and prices decline while access speeds increase," said Joel Martin, Research Manager

for IDC Australia.

Uptake of cable modems is also expected to increase during this period, but at a much slower rate. Cable modems are expected to grow at a compound annual growth rate of 110 over the next five years to 520,000 in 2004.

—Anna Raciti



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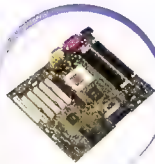
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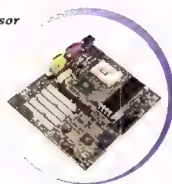
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3Com's latest NIC for Complete PC Management builds on 3Com's proven performance, reliability and intelligence. The NIC features enhanced Remote Wake Up, new standards-based Remote System Alerts, as well as compliance with Microsoft PC99 certification and PCI 2.2. This NIC continues to support existing management features such as the Managed PC Boot Agent and DMI.



ASUSTek COMPUTER INC.
<http://www.asus.com>

GRAPHICS

For Video Pros

Video producers and videographers take note. Pinnacle Systems (LakoVision; 1800 657 601; www.lakovision.com.au) has introduced a special limited Asian edition of DV500 Pro Edition, a complete real-time native DV nonlinear editing solution, at a suggested retail price of \$1899.

DV500 Pro Edition is a complete real-time, dual stream digital video production system based on the industry standard DV format, providing users with a native DV editing environment.

Packed with features, the DV500 Pro allows for simultaneous digital and analogue video with audio I/O, all on a

single PCI card. It also provides support for MPEG-2 output for DVD, interactive MPEG-2 CDs and Web video streaming applications. In addition, DV500 Pro includes Pinnacle Systems' new FreeFX, a powerful 3D effects library offered as a plug-in for Adobe Premiere. Also bundled is Pinnacle Hollywood FX Bronze version, to create custom 3D Transitions and effects.

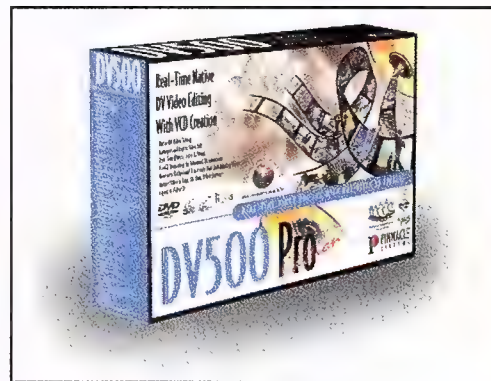
Pinnacle includes a content creation software suite, consisting of Adobe Premiere RT, Sonic Foundry's ACID Music, Pixelan Software's Video SpiceRack, Adobe Photoshop LE, RealNetworks Real Producer and a professional qual-

ity audio/video breakout box.

As an exclusive, TitleDeko as well as Minerva Systems' Impression software are included. TitleDeko adds creativity and impact with Hollywood-style titles, while Minerva Systems' Impression provides the ability to create in-

teractive MPEG-2 video that can then be targeted for CD-ROM or DVD playback.

—Maria Soranidis



WEB CAMERAS

Faster Webcam

Lakovision (1800 657 601; www.lakovision.com.au) is now shipping its new iBOT Desktop Video Camera, manufactured by Orange Micro.

The iBOT is a FireWire-based desktop video camera. By utilising the huge bandwidth potential of FireWire (also known as IEEE 1394), the iBOT harnesses clarity and speed unmatched by slower USB-based webcams. The iBOT also maintains a data transfer rate that's 16 times faster than traditional USB webcams, with a Video Frame Rate of 25 frames per second—a speed we are used to seeing in the local movie theatre—at the full video resolution of 704 x

576 size in full colour.

The iBOT is designed for video conferencing, simple movie making, office presentations, video e-mails, and surveillance purposes. Video teleconferencing for the Internet

is also made readily available with the inclusion of Video Teleconferencing software for both Mac and PC.

The iBot standard version (RRP \$410) comes with video conferencing software for both Mac and PC. The iBOT pro version (RRP \$495) offers additional Mac/Windows software including video editing for movie making and photo editing. The pro version also comes with a headset microphone.

—Rosina Di Marzo



OPERATING SYSTEMS

Whistler: Not Just PCS

Microsoft's Whistler operating system, due later this year, is expected to have a big impact on PC platforms, but a new variation of the prerelease operating system is aimed squarely at non-PC devices. Microsoft has unveiled a version of the OS, code-named Whistler Embedded, designed to slice the operating system up into components that can work with non-PC devices. These devices include Windows-based terminals, set-top boxes, and retail point-of-sale kiosks.

The parts that make up Whistler Embedded will be separately licensable, so device makers will be able to work with just the code they need to deliver specific services.

Delivering Internet services and new operating system func-

tionality to non-PC devices is one of the cornerstones of Microsoft's .Net initiative.

"We have a huge investment going into new, non-PC devices, including our Pocket PC and set-top boxes," says Microsoft CEO Steve Ballmer. Ballmer also stressed that streaming media will increasingly be delivered to non-PC devices: "When you talk to these wireless operators who've spent billions of dollars to buy wireless spectrum, you have to ask them, what are you most excited about doing with this high-bandwidth wireless spectrum? They all say, it's digital media. We've got to be able to have video calls, we've got to be able to stream movies and music to telephones, to Pocket PCs, to other handheld devices."



See more.



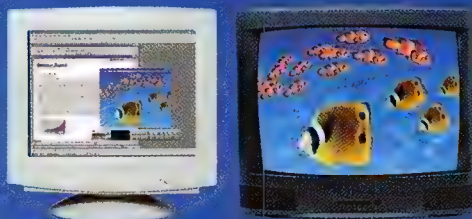
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DualHead EMBM



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INTERNET

Telstra's IP Solutions

Telstra (1800 266 000; www.telstra.com.au) has recently released IP services in an effort to provide users with seamless connectivity to their offices. The IP service can be accessed in metropolitan, regional and rural areas throughout the country.

The remote access data connection is part of Telstra's IP solutions range and enables companies to securely link to branches and individuals across Australia from a standard phone line. Telstra has recently reduced its call usage charges for its Dial IP remote access solution. More customers can now access the service at \$3.08 per hour, the lowest Australia-wide connection rate.

Private IP, another solution, is a data network that can be used as a scalable and flexible foundation for connecting offices, as well as providing a controlled means of linking to partners and the Internet. There are three

classes of service available through Private IP: Multimedia—offering higher network performance to support real time applications; Interactive—designed for applications that can tolerate minor network latency, such as video streaming; and Data Transfer—for IT applications that require good interactive performance but can tolerate minor network latency, such as e-mail, data base access, and file sharing. Private IP also provides flexibility, enabling businesses to upgrade their network one step at a time. They can use the Private IP service as the common interface between the old and the new parts of their network.

The flagship product in Telstra's IP Solutions family is the Wideband IP. It was developed in conjunction with Cisco Systems and enables organisations to dynamically change, in real time, the data access capacity of each office on the Wideband IP network.

Through a single Wide-

E-COMMERCE

E-Commerce Guide

Every year, thousands of products bought during the Christmas spending season have to be returned or exchanged. It's an easy task if you did your shopping at your local shopping centre, but what if you did some or all of your Christmas shopping online?

This and other questions about online shopping are answered in a handy guide set up by the Australian Direct Marketing Association. The guidelines, *Shopping on the Internet: Facts for Consumers* can be found at www.adma.com.au/consumer/guidelines.htm.

Inside, you'll find all sorts of e-commerce related information including: the benefits and risks of shopping online; a guide to sales tax and duty on imported goods; credit card safety information; a guide to what happens if there is a problem with goods bought online; and other information you should know before jumping into e-commerce.

You'll also find a section that deals specifically with Internet banking—what services are offered, risks and benefits associated with Internet banking, and dispute resolution.

—Anna Raciti

band IP connection to a company's office, integration of the existing data networking infrastructure can be improved—from simple dial-up to permanent data communications, through to Internet access and advanced "virtual private network" (VPN) ser-

vices. Wideband IP solution should help companies manage the ongoing performance and maintenance of their network and is designed to minimise investment in networking equipment and set-up costs.

—Rosina Di Marzo

E-COMMERCE

E-Biz Still on Top

Scary stories will not slow the growth of e-business. According to industry analysts IDC, the Asia Pacific region will continue to grow and the Intranet will grow with it as an application.

Despite doom-mongering and a shaky end to the year in the American and British technology stock markets, e-business will still be a major economic driver in 2001,

with spending and computer sales still increasing.

As e-business grows it will maintain healthy hardware, software and service sales across the Asia Pacific region. IDC believe the majority of this investment will follow the trend that began late in 2000 and come from brick-and-mortar businesses that are moving online. "The reason is simple; the battle is already engaged. For every

Dot-com that competes with an established business, there are a dozen more brick-and-mortar companies with online operations to worry about now," Piyush Singh, Vice President of IDC Asia Pacific said.

An increasing area of this growth will be the Intranet. IDC's research indicates that Intranet development will become an end-to-end integrated part of any e-business solution. Their research claims the Intranet is a "logical" step following the inte-

gration of enterprise applications and other e-commerce applications.

The research company predicts IT spending will reach a trillion dollars globally this year and that A\$70 billion of it will be spent in the Asia Pacific region, without the help of the Japanese economy.

News is also good for the local PC market. IDC predicts that there will also be 75 million PCs installed by next Christmas in the region.

—Mark Chillingworth



Actual size

SHOOT A BUG'S LIFE

Canon MV3i MC Digital Video Camera. Think big and shoot a small epic of your life with the cleverly miniaturised Canon MV3i MC. Your friends and family will hardly notice this tiny video camera in your hands. And neither will you, it's so light. The camera might be the world's smallest but the LCD screen is a sizeable 2.5" so it's easy to watch your movies progress. And when it's time to capture a moment, you can take a photograph. The digital images are astounding. It's a small world, the tiny MV3i MC will help you capture it. That's a good idea. That's a Canon. For more information call 1800 816 001 or visit www.canon.com.au

MOBILE PHONES

What's With WAP?

WAP (wireless application protocol) has certainly been one of the most touted mobile wireless technologies of all, but some new usability tests in Europe indicate that WAP technology may still be at the work-in-progress stage.

Jakob Nielsen, principal of the Nielsen Norman Group, has made a name for his technology research group doing real-world usability tests around the globe with cutting-edge technologies. For his latest test, Nielsen handed out Ericsson R320s and Nokia 7110s WAP phones to mobile phone users in London.

To see if the new generation Net-smart phones would score a hit with users, the subjects in Nielsen's study were instructed to perform basic tasks such as looking up headlines and checking sports scores. The users then got to keep the phones for a week to try out other tasks, and kept diaries of their experiences.

The users in the study were mostly unhappy with the WAP experience because performing simple tasks took too long. Looking up a weather forecast or retrieving headlines, for example, took at least a minute, and often more than two minutes. Users in the study indicated that they thought such tasks should take no more than 30 seconds. "Our conclusion that WAP doesn't work is based mainly on the examination of timed task-performance studies," says Nielsen.

When users in the field

study were asked whether they were likely to use a WAP mobile phone within twelve months, a whopping 70 percent answered no. However, when users were asked whether they might get a WAP phone within the next three years, the no responses dropped to only 20 percent.

Nielsen's study did conclude that better user interface design for WAP applications can alleviate some problems. For example, the English newspaper *The Guardian* has its own portal for retrieving headlines on WAP phones, which users overwhelmingly preferred to the standard portals that were provided with the WAP phones.

There have recently been some other encouraging reports on the future of WAP phones. Ericsson CEO Kurt Hellstrom, at Comdex 2000, pointed out that there are now 26 million WAP phones in use, mostly in Europe, up from only 3 million last July. However, Hellstrom acknowledged that WAP has had a slow start. Market researchers at Dataquest have also reported signs of strong growth for WAP phones.

However, Jakob Nielsen sums up his group's conclusion from the WAP field study in London by pulling no punches: "We recommend that companies sit out the current generation of WAP, which is not ready for prime time yet, but continue planning their mobile Internet strategies. Don't waste your money on fielding services that nobody will use."

—Sebastian Rupley

LAUNCH PAD

The **ipalm PV-DC3000** is the new 3.3 megapixel digital still camera from **Panasonic** (13 26 00; www.panasonic.com.au). It features an SD card slot, and is equipped with 2x optical and 3x digital zoom. The ipalm runs on four AA batteries, and comes with Adobe PhotoDeluxe and QuickTime. It retails for \$2034.



Brother (02 9887 4344; www.brother.com.au) has released the **FAX-645** plain paper fax machine. The \$359 fax has a 14.4Kbps fax modem, ten-page automatic document feeder, and a 30-sheet paper

capacity. The FAX-645 also features 50 speed-dial numbers, with a 512KB memory that can store 20 fax messages, and a Multi-Function Link PC interface.

The **Hitachi** (02 9888 4100; www.hitachi.com.au) **CML170SXW** flat panel 17in LCD monitor is available now for \$3395. It features an SXGA resolution of 1280 x 1024, a high contrast ratio, and 160-degree horizontal and vertical viewing is possible. The monitor is plug-and-play compatible, weighs 6.5kg, and consumes 54W at maximum power.



Hanimex (02 9466 2600; www.hanimex.com.au) has announced the availability of the **Fujifilm Finepix Printer NX-500**. The printer can produce a 4 x 6in print at 306dpi in about two minutes, and its footprint

is about the size of a laptop. The \$799 NX-500 also features a SmartMedia card drop-in slot for transferring images from digital cameras.





Actual size

NO UNSIGHTLY BULGES

PowerShot Digital IXUS 210 Camera. With the smallest digital still camera in your pocket, you can have a sleek stylish look with nothing protruding. Not only is the PowerShot Digital IXUS the world's smallest digital still camera, it's also the world's most stylish. The stainless steel body is designed not only for looks but also for endurance. With the 2.1 megapixel resolution you can output images of an astounding quality. And being digital, you can plug it directly into your computer. The PowerShot Digital IXUS, perfect for the image conscious. That's a good idea.

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Lab Notes

During any normal month, the Lab has its fair share of minor problems—one example is the case when a product arrives with something missing or faulty and cannot be tested until the problem is resolved. But fate, bless its perverse

nature, saves the best for when you are least able to cope with it.

Take this issue of the magazine. We carried out the testing in December (not a normal month at all, because we have only three weeks to do four weeks worth of work). Actually it was worse than this, as we not only test for the magazine but also for other government and corporate clients as well. And, of course, they all want their reports by Christmas.

For the motherboard test, we actually received quite a few more than 13 Socket 370 motherboards but we suffered the most severe attrition rate in the history of the Lab. Several of the boards that made it into the review, for example, were not incident free, the first Intel board was DOA and the FIC FB-11 was about as stable as a drunk on a trampoline while running our 3D and games tests. These two were the lucky ones though, Intel quickly sent through a working motherboard and FIC directed us to new AGP drivers for the BX chipset.

Many of the other boards were not so lucky and for them time simply ran out. One vendor in Taiwan shipped three preproduction motherboards sans driver disks or documentation. Obviously nothing was going to happen without the drivers, which arrived just at the end of our test schedule. Even so, we thought we could just slip this batch through. Wrong! They would not boot up with our 866 PIII—two just sat mute and the third claimed the processor was a 566MHz before it would hang. The vendor tracked the problem down to the fact that the three boards had been loaded with an old “flaky” version of the BIOS, but by this time we had finished testing and were a good way through the write-up. A board from another vendor suffered exactly the same fate while two more boards were simply DOA and replacements could not be sourced in time.

Sadly, testing motherboards is not like testing PCs where you can set up all the PCs at the same time and then run the tests simultaneously—we simply do not have 13 identical hard drives and 13 identical GeForce

GTS 2 cards, memory modules, etc, to set them all up at once. We also test the products in the order they arrive, it's the only fair way really, and this gives the early vendors time to respond to problems. But conversely, the late vendors run the risk of running out of time.

Our problems were not just restricted to motherboards either—we had our first ASUS V7700 Deluxe card die inexplicably during testing and must thank Achieva

for responding so quickly to our plea and fast tracking a new card to the Lab. This one really took us by surprise as we have had a long

*I must admit I heartily applaud Intel's practice putting a **metal cap** on the top of the **P4** die.*

association with ASUS products and have never had one fail on us, I guess there is a first time for everything. The other failure had a more severe impact on our testing. Our 1GHz Athlon socket A processor on loan from AMD also decided to go belly up during testing. This was not really the fault of the processor, apparently the heatsink we were using was placing too much stress on the CPU die and a tiny crack developed in the corner—a chunk of CPU about the size of a grain of sand parted company with the CPU. I shudder to imagine how many gates went west with that small fragment but it was certainly enough to kill the processor. Luckily, AMD was able to source a second processor and shoot it through to us, but the delay was just enough to force us to split the comparison into two: the Athlon motherboards will be appearing in the March issue of PC Mag.

I must admit I heartily applaud Intel's practice of placing a metal cap on the top of the P4 die, it probably won't matter too much to the average end user whose CPU, once installed, stays there until it is updated. But at the Test Lab, where we are plugging and unplugging the CPU into numerous motherboards, the dies are simply not robust enough.



Steven Turvey

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Music Players

BY DANIEL S. EVANS, JEREMY A. KAPLAN, AND CAROLA A. MANGIS

Now that you've downloaded or ripped all those songs onto your hard drive, what's the best way to organise and play

them on your PC? We audition seven software music players to find out which is the best jukebox for your music files.

MEDIA JUKEBOX 4.0

Media Jukebox uses RealPlayer and Microsoft Windows Media Player to play audio and video files, but it provides an interface that gives you a lot of power over your music (alas, style is not its strong point). The crowded toolbar consists of buttons that let you effortlessly import music files, rip CDs at up to 320Kbps, use CBR or VBR encoding, write to CDs, convert file types, record digital music from any outside source that can be plugged into your line-in jack, and organise your media files in a gratifyingly large number of ways.

You also get one-click access to music on the Internet—download sites, radio sites, and TV sites, which conveniently appear right within the interface. If you have an impulse to buy the song you're listening to, click the Buy CD button and Media Jukebox searches buying sites for that song. Media Jukebox can also download your music to a wide variety of portable players, among them

the Creative Nomad and the Creative Nomad II, the S3 Rio 300 and 500, and Microsoft Windows CE devices. By the time you read this, a new version of the player, with even more functionality, should be available.

Media Jukebox 4.0

Price: Free Download. J. River.

www.musicex.com/mediajukebox RATING: ●●●●

MUSICMATCH JUKEBOX 5.1

MusicMatch Jukebox 5.1 is one of the most powerful music players we've seen. It's a deeply configurable, multipurpose audio and video tool. You get the standard functionality offered by most players in this roundup: you can organise music by making and saving playlists, and burning a CD is drag-and-drop-simple.

You have myriad options when recording and encoding. You can encode at rates ranging from 64Kbps to 128Kbps in the standard version and all the way to 320Kbps in the Plus version, choose CBR or VBR encoding, and opt for digital or analogue recording. Another feature that sets MusicMatch apart from most players is its ability to play both streaming audio and video (RealJukebox Plus and Windows Media Player can also do this). When MusicMatch is properly configured, you can use Icecast, M3U, Shoutcast, and ASF/ASX (a Microsoft video compression format)—and the player even offers an integrated Net radio tuner. Tagging functionality is powerful, letting you edit Artist, Genre, and about ten

IT'S FINALLY HERE!

The long-awaited PlayStation 2 is finally here and, with all its entertainment features, is certainly meeting expectations. *Page 50.*



More Products Reviewed

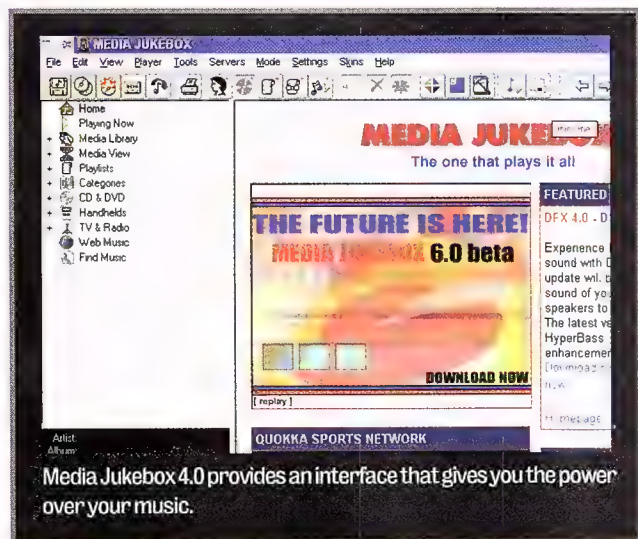
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WHAT THE RATINGS MEAN

- EXCELLENT
- > VERY GOOD
- >> AVERAGE
- >>> FAIR
- >>>> POOR



Media Jukebox 4.0 provides an interface that gives you the power over your music.

other fields, and it even lets you import cover art. Other features of the Plus version are the ability to burn tracks six times as fast as the standard version does, an equaliser, and an option for printing jewel-case liners.

MusicMatch Jukebox 5.1

Price: Free Download. MusicMatch.
www.musicmatch.com
RATING: ●●●●●

REALJUKEBOX 2

RealJukebox 2 supplies all the

CDs from within the program. You can encode in Real, WMA, WAV, or MP3 format at up to 320Kbps in the Plus version. (RealJukebox's default is to encrypt MP3 files so that they can be played on only your computer, but you can disable this feature.) You can also downsample on the fly, reducing a song's file size for better portability on a digital audio player (22 devices are supported).

The free Basic version also gives you great skins and visuali-

for recording. One other cool touch: Real is working on a music delivery service that will send music in your favourite genre to your e-mail in-box.

leave (AVI), RealAudio, and MPEG-2 Advanced Audio Coding (AAC)—and imports them. If you're ripping from a disk, RAM3 provides you with



features and functionality you need from a software jukebox. But even though the interface seems cluttered compared with the clean lines of Microsoft Windows Media Player 7.0, for example, you really need to hunt for some of the powerful features.

The heart of any jukebox package is the music manager, and RealJukebox's exhaustive ID3V2 tag editor is a particularly robust one; it handles dozens of fields. Press the question-mark icon beside the search field for instructions on how to search your music library for a track, an album, an artist, or even an encoding rate.

RealJukebox uses Adaptec's Easy CD Creator engine to burn

sessions, which you can set to launch and apply automatically by playing a specific song. The Plus version adds VBR encoding, a cross-fade feature, and the ability to input analogue sources



RealJukebox 2

Price: Free Download. Real Networks.
www.real.com
RATING: ●●●●●

RIOPORT AUDIO MANAGER 3

RioPort Audio Manager 3 (RAM3, download) allows you a large amount of control over your digital music library. Unfortunately, RioPort charges an upgrade fee for some features you can find for free elsewhere.

RAM3's front end is intuitive and easy to configure. It searches your hard drive for applicable file formats—MP3, WMA, QuickTime, Audio Video Inter-

a few different encoding options: MP3 or WMA, at speeds from 64Kbps to 256Kbps. You can then configure your files into playlists and sort them by name, size, file type, and more. Burning CDs and transferring individual tracks or playlists to a portable device are easy procedures.

RAM3 currently supports all S3 Diamond Rio models, the Compaq iPAQ PA-1, and any other hardware players that use industry-standard Media Device Manager (MDM) and API-related Service Provider Interfaces (SPIs). For those concerned with looks, you also get over 100 visualisations.

The standard version of RAM3 is a free download. It lets you encode an unlimited number of WMA encodes and up to 50 MP3 encodes, but you can burn only 25 CD tracks. You must pay for an upgrade that gives you unlimited burning and encoding capabilities.

RioPort Audio Manager 3

Price: Free Download; Audio CD burning and MP3 encoding capabilities, US\$18.95 direct download. RioPort.
www.rioport.com RATING: ●●●●●

Full colour, superior economy. \$119.^{RRP}

BRILLIANT PHOTO COLOUR on plain paper, super operating economy, high speed blacks, PhotoRealism and automatic image improvement. You can't go wrong with the super value BJC-1000SP.

Brilliant plain paper photo quality automatically.

The BJC™-1000SP uses advanced colour definition routines for half-tones and areas of low colour density. A separate, selectable function called Photo Optimiser is included in the printer control software.



Before.



After.

It automatically adjusts for defects in exposure, highlights and shadows, and prints accordingly with standard inks designed to optimise quality on low-cost plain paper.

Reduced operating costs.

Using a special resolution matrix, the BJC-1000SP features a Super Economy mode that vastly improves operating economy without the definition sacrifices common to so many draft modes. It effectively quadruples output from both the black and colour cartridges.¹

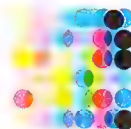
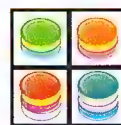
High quality blacks at high speed.

The optional high capacity black ink cartridge uses 64 print nozzles for high print speeds. The selectable text smoothing mode goes up to 720 dpi to maximise text quality.



Optional BC-03
high capacity black ink cartridge.

PhotoRealism produces
colours between colours.



PhotoRealism™. When superior photographic reproduction counts.

The optional PhotoRealism cartridge is ideal for high resolution paper, glossy photo paper and high gloss film.

Low-density inks vary colour saturation per dot to dramatically increase the colour combinations, reduce graininess and smooth tonal gradations.



Better Internet images.

Image Optimiser, a printer control software feature, can automatically "correct" low-resolution images up to the printer's maximum resolution.

Print banners up to 6 A4 pages long, envelopes, overhead transparencies, T-shirt transfers, and even choose an optional fluorescent ink cartridge for display effects.



BJC-1000SP

Just \$119^{RRP}

Canon Customer Care. The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support.

For more information call 1800 021 167.



Canon



Not only does Sonique have one of the coolest interfaces, it also gives you a lot of control over music play back.

LYCOS SONIQUE 1.63

Although Sonique 1.63 doesn't have all capabilities of all-in-one programs such as MusicMatch and RealJukebox (you'll need other tools for ripping, encoding, and downloading your music to portable players), the player does have one of the coolest interfaces we've seen. It's animated and windowless, and at Soniques' Web site, you'll find amazingly creative skins to download. Unfortunately, the interface is a little tough to figure out; we had to hit the Help section for guidance. Luckily, context-sensitive on-screen and online help is exhaustive and clear.

Built-in Internet integration is another plus: Sonique helps you find music, concerts, Internet radio, and more with one click. The player supports MP3, WMA, and other file formats, as well as the many available plug-ins. You also have a lot of control over music playback: included is a 20-band equaliser with pitch adjustment and balance control and an AE4 MPEG audio decoder. On the downside, organisation features are not the player's strong point. You can create and edit playlists, but unlike with most players, there's no built-in way to categorise music files under headings such as Album, Artist, and Genre, which is an easier way to work

with your music.

Lycos Sonique 1.63

Price: Free Download. Lycos.
www.lycos.com
RATING: ●●● >>



NULLSOFT WINAMP 2.64

Nullsoft's Winamp has been around longer than most software audio players, and it has a large group of faithful fans. After trying out some of the player's more dazzling cousins, we concluded that it's a solid product for those looking for a simple, stripped-down player with some useful features.

Winamp 2.64 supports a wide range of audio formats including MP3, WAV, and WMA. Songs are easily added and removed from playlists, and you can edit song information with an ID3 tag editor. Songs are stored by track number (for albums) or alphabetically, and you can scroll through but not search.

Winamp's ten-band graphic

equaliser and built-in preamplifier are strong features. You can even have the player autoloading previously saved, song-specific preamplifier and equaliser settings. Unfortunately, the amplifier doesn't work with CD audio and MIDI plug-ins. With these formats, the sound data never actually passes through Winamp but goes directly through your sound card instead. For more advanced features, such as CD ripping and burning, Winamp recommends several plug-ins.

Nullsoft Winamp

Price: Free Download. Nullsoft.
www.winamp.com
RATING: ●●● >>

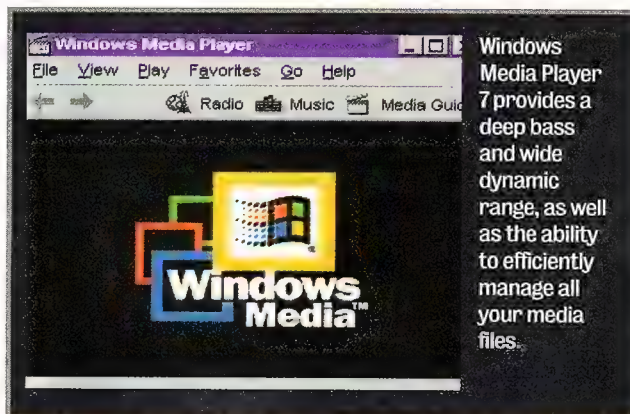
lacks support for a common open standard: it won't record MP3 files. Most users will probably opt for a more well-rounded product.

WMP's core functionality is also limited. You won't find as many search options as in RealJukebox. You can edit track info, but just the proprietary metadata Windows Media Player stores in its internal database, not ID3 tags. A powerful tag editor is crucial when you have a large music library to search. The program doesn't use the omnipresent Grace note (née CDDb) service to obtain track information, relying instead on AMG—but that's a reasonable alternative.

Here's what Microsoft Windows Media Player 7 does have to offer: it plays video files (in many popular formats), so it can manage all your media files. It includes a ten-band equaliser and SRS WOW technology, which provides deep bass and a wide dynamic range. Also, an integrated radio tuner is prominently placed in the left-hand panel. And there are tons of skins and eye-catching visualisations. The player could be a versatile companion to another player.

Microsoft Windows Media Player 7.0

Price: Free Download. Microsoft.
www.microsoft.com
RATING: ●●● >>



Windows Media Player 7 provides a deep bass and wide dynamic range, as well as the ability to efficiently manage all your media files.

1440 dpi, separate transparent ink tanks with monitoring system. \$279^{RRP}

EXTRAORDINARY QUALITY, superior operating economy, high speed printing plus extra rich blacks, parallel & USB ports for Windows and Mac, optional PhotoRealism and scanner cartridge.

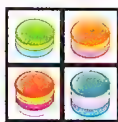
Advanced imaging performance.

Resolution goes up to 1440 x 720 dpi. Drop Modulation Technology™ adds variable ink drop sizes that are automatically used in any of five pattern combinations. Then, the printer control software uses colour definition routines more in line with perceptions of the human eye. The benefits are obvious. Sharply defined lines and text. Vivid, more natural looking colours. Subtlety in shaded and highlighted regions with smooth colour gradations.



Colours between the colours with optional PhotoRealism™

Low density inks vary the saturation level per dot (e.g. 33% or 67%) for up to five times as many colour combinations as conventional CMYK inks for smoother colour and tonal gradations with vastly reduced grain, even in areas of low colour density.

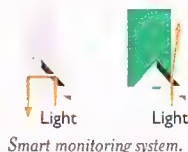


PhotoRealism produces colours between colours.

Transparent ink tanks, "smart monitoring system," superior operating economy.

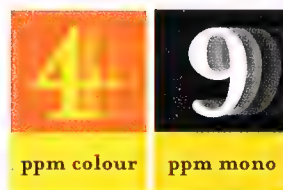
Standard inks are optimised for plain paper. There are individual, transparent ink tanks for all colours, and each is separate from the print head.

A beam of light measures ink status through a prism moulded into the bottom of the tanks. This allows a printer driver monitor to report on ink levels, and alert you when an ink is running low. You replace only one colour at a time, and don't have to worry about running out of ink.



High speed printing for all colours, blacker blacks.

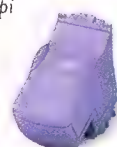
Using large print heads and bi-directional printing it prints up to four colour pages per minute. An optional, dedicated



black ink tank and cartridge with 160 print nozzles is capable of B&W speeds up to 9 pages per minute.¹ And the black in both the standard and optional cartridge is an extra-rich black ink.

Automatic Image improvement, broad flexibility, optional scanning. Photo Optimiser adjusts for defects in exposure, highlights and shadows, and prints accordingly.

Image Optimiser can print low-resolution Internet images up to the printer's maximum resolution. Print banners up to 6 A4 pages long, envelopes, overhead transparencies and even T-shirt transfers. Turn your printer into a 720 dpi colour scanner with the optional scanner cartridge, pictured right.



BJC™ - 3000
Just \$279^{RRP}

Parallel and USB interface. Both ports are built-in for Windows and Macintosh.²



Canon Customer Care. The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.

Canon

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Gateway's High Performance

BY BILL O'BRIEN

The aptly named **Gateway Performance 1500xl** is all about high-end performance. While we have some reservations about the features, the benchmark numbers don't lie. The Performance 1500xl is the current top system (albeit by a razor-thin margin) for gamers and others looking for the most power at any price.

Whether its business applications, 2D and 3D graphics, or video, the Performance 1500xl had the best all-around performance of all the high-end system we tested. Equipped with a graphics card based on the nVidia GeForce2 Ultra chipset and 64MB double data rate (DDR) memory, the Performance 1500xl really stood out on graphics tests, especially 3D WinMark 2000. For more mundane tasks, the Performance 1500xl is also up to the task with excellent scores on Winstone tests that gauge performance on business and content-creation applications.

Keep in mind, however, that the differences in the benchmark scores between the Performance 1500xl and other P4-based systems were generally minor. None of these systems will disappoint gamers.

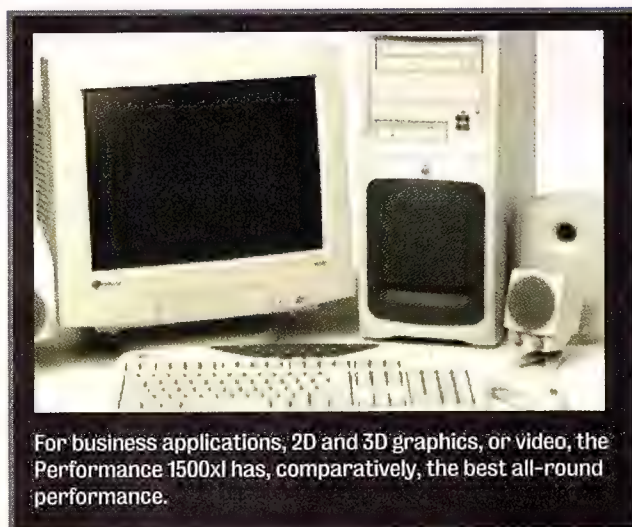
The only area where the Per-

formance 1500xl performed below average was on hard disk tests, and we suspect this is due to the ATA/66 interface.

For its pricetag of nearly \$7500, we would prefer an Ultra ATA/100 interface, not to mention a little bigger hard drive than the 30GB model in our test system. Aside from this, the Performance 1500xl is fully loaded.

The digital speaker system and Gateway's VX720 monitor also had a hand in the system's superior multimedia capabilities. The Boston Acoustics BA7500 Dolby Digital SST speakers are arguably among the best you'll find. As for the 17in VX720 monitor, it's great with graphics, and the Fine Picture Mode seems to add depth to video playback. Overall, this adds up to one of the best personal theatre experiences we've seen any PC deliver. Both DVD and CD-RW drives are part of the package.

The Performance 1500xl's chassis is toolfree and painless. Slide two latches at the back and the side panel pops open. There's no chance of catching your fingers anywhere. Removing or installing PCI cards is also easy. One thumbscrew holds a flex-plate firmly across the entire backplane. (It's used in place of the individual screws that would normally hold down each card.) Undo the thumbscrew and you can push the



For business applications, 2D and 3D graphics, or video, the Performance 1500xl has, comparatively, the best all-round performance.

flex-plate away from the backplane while you fiddle with the PCI cards. Installing or removing drives is also toolfree—a separate latch holds the drives in their bays.

You probably won't need much more than Gateway already gives you, which is fortunate since there's not much expansion room in the 45 x 20 x 45cm midtower case. One accessible and two internal 3.5-inch bays are all you have. And while there is one unused PCI slot on the ISA-less motherboard, depending on the size and design of the PCI card, you might have difficulty clearing the heatsink on the adjacent AGP graphics card—it's a pretty tight squeeze.

Although the Performance 1500xl is covered by a 1-year, onsite warranty (parts and

labour), you may never actually receive onsite service. It's implemented at Gateway's discretion on a case by case basis, and the decision is made by Gateway. A clearly defined policy would be preferable.

We've yet to come across a Pentium 4-based system, including the Performance 1500xl, that offers the perfect blend of top performance and all the features you'd expect in a high-end system. But if you're going to be one of the first to buy a P4 system, chances are you're interested in one thing—speed. In this area, the Gateway Performance 1500xl excels.

Gateway Performance 1500xl

Price: \$6299. Gateway. Ph: 1800 500 916; Fax: 02 9966 1754; www.gateway.com.au
RATING: ●●●●

CorelDraw's Upgrade

BY SUSAN GLINERT

Both print and Web designers will find much to like in version 10, and new users will benefit from the simplified interface. In sum, we found **CorelDraw 10**

Graphics Suite to be robust, powerful, and easy to use—the perfect suite for both casual users and graphics professionals.

Some software upgrades are just minor enhancements; others qualify as true events. Although it's not as extensive an overhaul as that of version 9, **CorelDraw 10 Graphics**

Suite has lots of new goodies, as well as a new vector-animation program, **Corel R.A.V.E.**, similar in concept to **Macromedia Flash**.

Corel streamlined the interfaces for both **CorelDraw** (vector illustration) and **Photo-Paint** (image editing). Both programs share the new colour-management tools and

Export to Web preview dialog box. The colour-management feature is wisely designed, showing you exactly how all the device colour spaces interact and making it reasonably simple for a novice to actually use profiles by selecting presets optimised for specialised tasks—desktop printing, professional output, and Web.

Big printer performance.

Small printer price & economy. **\$159^{RRP}**

HIGH RESOLUTION COLOUR, high-speed blacks and superior operating economy with easy to use, broad flexibility for Windows and Mac. Plus optional PhotoRealism and scanner cartridge.



Exceptional results, easily.

The inks are optimised for plain paper with resolutions up to 720 x 360 dpi that can be automatically enhanced with Drop Modulation Technology.TM Variable drop sizes are placed in any of five "strike pattern" combinations to smooth colour gradations and improve tonal quality.



Reduced operating costs.

Super Economy mode uses a special resolution matrix to improve operating economy without the definition sacrifices common to so many draft modes. It effectively quadruples output from both the black and colour cartridges.¹



Better Internet images, special effects.

Image Optimiser can automatically "correct" low-resolution Internet images up to the printer's maximum resolution. Turn photos into simulated illustrations and create sepia and mono hues, print banners up to 6 A4 pages long, envelopes, overheads and even T-shirt transfers.

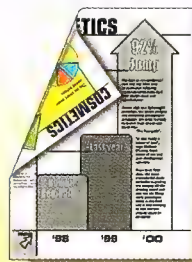


The optional scanner cartridge captures colour photos and text with resolutions up to 360 dpi.



Automatic Image Improvement, easily.

Advanced colour routines help define half-tones and areas of low colour density. Photo Optimiser automatically adjusts for defects in exposure, highlights and shadows and prints accordingly.



Duplexing, high speed blacks. A new driver allows manual duplex on plain paper with standard inks.

For B&W only, an optional dedicated black ink cartridge with 128 print nozzles offers print speeds up to 5 pages per minute.²

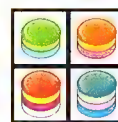


Built-in parallel and USB interfaces for Windows and Mac.³



Drop Modulation Technology.

Smaller ink drops, about 1/3 the size, are automatically mixed with standard drops to enhance quality.



Layering variable ink densities in each pixel lets you print colours between colours.

5 times the photographic colour combinations.

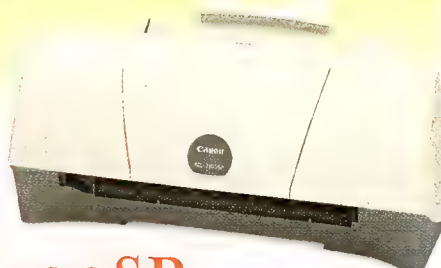
Optional PhotoRealismTM inks vary the saturation so that a single dot could have 0%, 33%, 67% or 100% of a colour. This produces up to five times as many colour combinations as conventional CMYK inks for better half-tones and less grain.



Canon Customer Care.

The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.

BJCTM - 2100SP
Just **\$159^{RRP}**



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CorelDraw gains one major new feature—customisable shape objects retain their proportions and connection hot spots—and many little enhancements to drawing tools. But our favourite addition is the Undo list, a feature usually found in image-editing programs. By preserving the last 20 or so steps and letting us step backwards and forwards, the Undo list gave us experimental flexibility that was impossible with the old single Undo command. CorelDraw now lets you create rollover graphics (Web buttons) and optimise graphics for the Web, a la Adobe ImageReady and Macromedia Fireworks.

The most prominent new feature in Photo-Paint is the ability to flow text on a path. We were delighted to see that now, when text is modified, it remains editable without los-



ing any of its attributes, as it did in version 9. We still find Photo-Paint a bit underpowered compared to Photoshop in the colour-correction department. On the other hand, Photo-Paint's infinitely configurable natural media brushes rival those in Painter and add interesting effects such as Or-

bits, which let you paint with pods and rings.

The newest family member in the CorelDraw suite, Corel R.A.V.E, comes equipped with the usual complement of animation functions—layers, timeline window, animation objects along a path, blending objects over time (tweening),

and adding sound bites to movies. Finished documents may be exported to Flash (SWF), GIF, AVI (Video or Windows) or MOV (QuickTime) format. R.A.V.E's interface feels like a natural extension of CorelDraw, adding a time dimension to 2D artwork.

You can't import Flash, so if you have a portfolio of them you want to use, you're out of luck unless you first save them out in AVI or MOV format. We also had a few problems with Draw and Photo-Paint, most notably the case of the disappearing toolbars. Apparently, the tools sometimes become "unregistered"—an annoying, but not fatal, flaw.

CorelDraw 10 Graphics Suite

Price: ERP \$1370. Corel. Ph: 1800 658 850; Fax: 02 9006 1500; www.corel.com RATING: ●●●●)

Firing up with Radeon

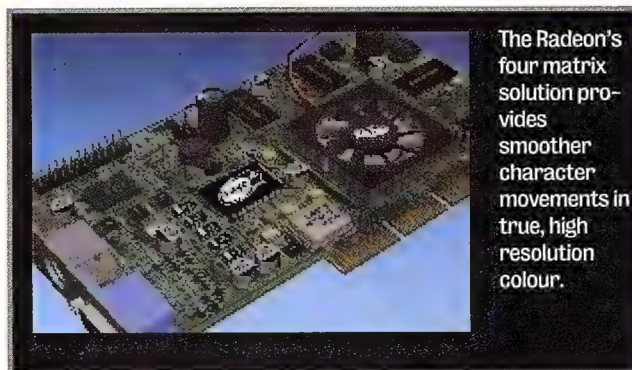
BY BILL O'BRIEN

If you thought the nVidia GeForce2 GTS had won the battle of the fastest 3D-graphics accelerator, you might be in for a surprise. ATI Technologies has fired a major salvo with its new Radeon graphics processor, which powers the company's \$599 Radeon 64MB DDR graphics card.

The Radeon chip's two key features are its Charisma Engine and Pixel Tapestry architecture. Charisma handles the transformation, clipping, and lighting functions. It also supports four-matrix vertex skinning, the rendering technique used to display an animated character's "skin" between its skeletal joints. A four-matrix solution provides smoother and more realistic-looking character movements than the two-matrix approach of the

GeForce2. Pixel Tapestry is the Radeon's detail engine, allowing up to three textures to be rendered in a single pass. (The GeForce2 does up to two at a time.)

Although its 16-bit colour score of 107 on 3D WinMark 2000 (at a 1024 x 768 resolution) was not shabby by any means, the Radeon was about 21 percent slower than a GeForce2-based board with 32MB DDR. However, when we bumped the colour up to 32-bit, the Radeon's score of 102 pushed ahead of the GeForce2 by about 10 percent; still, it lagged behind GeForce2 Ultra by about 40 percent. We kept the colour depth at 32-bit and put the Radeon through the paces with Quake III Arena. The resulting 76.3 frames-per-second result was faster than our eyes could follow.



The Radeon's four matrix solution provides smoother character movements in true, high resolution colour.

The card includes composite and S-Video outputs for sending the signal to a TV set and a composite-video input jack for video capture. The Radeon also supports hardware MPEG-2 conversion and DVD movie playback.

Much of the chip set's advanced feature set was designed with an eye toward rendering technologies and techniques that have yet to be built into games. If ATI's predictions materialise, the

Radeon will be in a unique position to display these future games at their highest-quality settings and frame rates. In the meantime, the Radeon is still an excellent, albeit somewhat costly, choice for gaming in true colour at high resolutions.

ATI Technologies RADEON 64MB DDR

Price: \$599. Servex. Ph: 02 8762 3522; Fax: 02 9746 3290; www.servex.com.au RATING: ●●●●)

Super fast dual print heads, 1440 dpi, 6 ink colours. \$399.^{RRP}

**ULTRA HIGH SPEED,
superior operating
economy, whisper quiet
and brilliant quality.
Plus optional 6-colour
PhotoRealism.**

Advanced print head system.

The compact body utilises a dual print head system designed to satisfy the needs of even the most demanding user. Speed, plain paper quality, extra rich blacks, individually replaceable transparent ink tanks plus optional 6 colour PhotoRealism and high definition colour scanning. The BJC™-6200 offers it all, in one of the quietest printers ever.



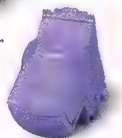
Superior plain paper print quality.

Standard inks are optimised for plain paper. Resolutions go up to 1440 x 720 dpi. Drop Modulation Technology™ automatically adds variable ink drop sizes and the printer control software defines colour more in line with perceptions of the human eye.



A smart ink monitoring system alerts users when a colour is running low. There are individual transparent ink tanks for all colours and each is separate from the print heads, significantly reducing operating costs and allowing you to replace only the empty tank.

An optional scanner cartridge delivers resolutions up to 720 dpi.



BJC-6200
Just \$399^{RRP}



Built-in parallel and USB interfaces for Windows and Mac².

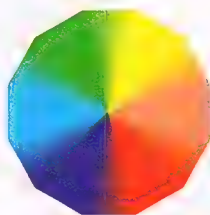
Higher speed, blacker black.

A high performance engine with bi-directional printing capable of up to 3 lines per pass results in monochrome text speeds up to 10 pages per minute and colour printing up to 7 pages per minute, making the BJC-6200 easily the fastest printer in its class.¹ Plus the black cartridge employs pigment inks for a richer print density with greater water resistance.



PhotoRealism™ with 6 ink colours for even more tonal gradation.

Optional low density PhotoRealism inks may be used simultaneously with standard density colour inks. The 6-colour system delivers life-like reproduction, especially on higher paper grades. Tonal gradations are smooth even in difficult to reproduce colours such as skin tones and light, glossy surfaces.



Canon Customer Care.

The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.



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More for Your Music

BY PEITA DUGGAN AND OLGA JEVDIC

One of the major benefits of a portable MP3 player over a portable CD player, is not having to take along numerous CDs wherever you go. By playing both audio and data tracks, however, these MP3 CD players completely eradicate that problem. By burning MP3 onto a CD as a data file (we used Adaptec Easy CD Creator 4.0), you have approximately 650MB of storage on a CD-R instead of the paltry 75 mins of audio usually on a CD. We created MP3 files, encoded at a rate of 128kbps, using MusicMatch Jukebox. This produced songs with an average size of 4MB, which gives you about 170 songs per CD!

MPZOO PORTABLE MP3 DISC PLAYER:

The MPZOO player is a lightweight and attractive player. It functions exactly like a regular portable CD player, by playing regular audio CDs, and also plays CD-Rs (but not CD-RWs, or CD-Rs that exceed

650MB). The player has a Power On/Play button, Stop/Power Off button and Next button to skip tracks. It also has a repeat button and a button to program play lists, skip through directories and record up to 500 seconds of audio. The buttons are quite small and our testers had some difficulty using them.

The small LCD shows track information, battery life, play modes and graphic equaliser modes. The player is powered by two AA batteries (not included), and also comes with an AC adaptor which will charge rechargeable batteries if you leave them in the player whilst it is switched off. Rechargeable batteries provide about 1 1/2 hours of playback.

A 50 second anti-shock buffer provides smooth playback when you are on the move, and the stereo headphones provided produce quality sound.

Unfortunately, MPZOO does not provide any software or an instruction manual, but their Web site has an excellent online manual. Overall, the MPZOO provides top quality features and playback, and apart from the button size, we cannot fault its performance.



Top: MPZOO
Bottom: Pine SM200c

MPZOO Portable MP3 Disc Player

Price: \$299. MPZOO. Ph: 03 9528 5744; Fax: 03 9528 5844;

www.mpzoo.com.au

RATING: ●●●●

PINE SM-200C MP3/CD PLAYER:

The Pine SM-200C is a sophisticated and intuitive player. It plays CD-R and CD-RWs containing MP3 and MPEG files, as well as audio CDs. In the centre of the player is the circular control button, which has Power On/Play/Pause, Skip Forward, Skip Backwards, and Stop/Power Off functions.

There are also separate buttons for the Equaliser, Anti-Shock mechanism, Repeat and

Scan function (plays the first 10 seconds of each song), all of which are of a good size and easy to use. The LCD displays track information, play and equaliser modes, and battery life.

The SM-200C is provided with two rechargeable AA batteries, which give about three hours of play. If the Anti-Shock function is activated, expect a much shorter battery life. This player, like the MPZOO player, charges the batteries via the included AC Adaptor.

Also bundled with the SM-200C is the MusicMatch Jukebox software, a CD containing sample music and the user manual, headphones, carry case and a line out cable.

The Anti-Shock System was not as effective as that of the MPZOO, as the SM-200C only provides a 10 second buffer.

The Pine also allows you to skip ten tracks at a time, making it quick and easy to find that certain song.

Pine SM-200C MP3/CD Player

Price: \$349 CDS Australia. Ph: 02 9748 8812; Fax: 02 9748 8815;

www.pineaustralia.com.au

RATING: ●●●●

Worth its Weight in Gold

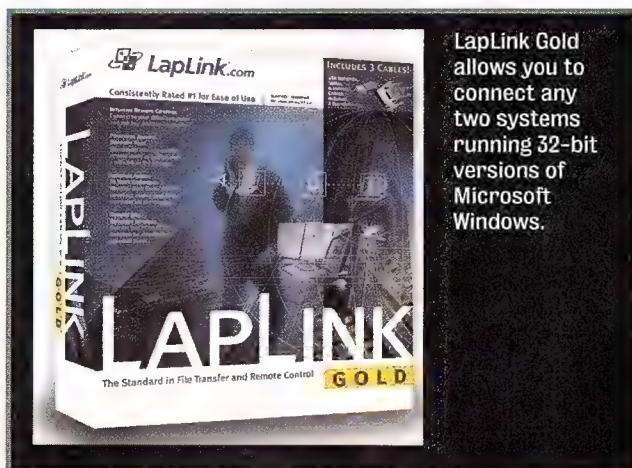
BY TED NEEDLEMAN

Whether over cable, an existing wired or wireless network, or dial-up telephone lines, LapLink Gold lets you connect any two systems running 32-bit versions of Microsoft Windows.

The LapLink Gold package includes three cables for connecting using the serial or parallel ports, or the two systems' USB interfaces. Beyond file transfer,

LapLink Gold now lets you control and operate the second PC remotely in a fashion similar to pcAnywhere, Carbon Copy, and other utilities. You can also set up password security to prevent others from such access.

The program is exceptionally easy to set up—unless you intend to use the included USB cable. This cable requires that USB networking drivers be downloaded at



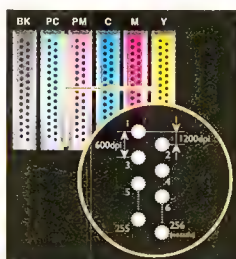
LapLink Gold allows you to connect any two systems running 32-bit versions of Microsoft Windows.

Microfine droplets, 1200 x 1200dpi. Just \$699.^{RRP}

ONE MILLION four hundred and forty thousand drops per square inch,
6 ink colours, 4 pico-litre sized drops and 33 tonal levels.
**Photo printing with zero-graininess image quality beyond the
limits of human eye-sight.**

Smaller, better ink droplets.

A unique Canon process called
MicroFine Droplet Technology™
produces 4 pico-litre ink drops.
Using a special star shaped nozzle
each droplet is created to be centre-
weighted and near perfectly round
for more accurate placement.

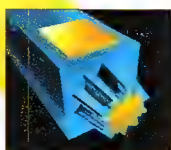


Nozzle layout diagram.

**Extra large print
heads with 6
transparent ink tanks.**

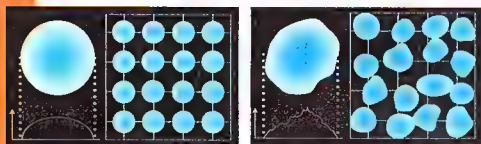
There are 256 print nozzles
per colour for a total of
1,536 on the print head.

This helps resolve the
conflict between speed and
quality. Separately replaceable, transparent ink tanks
and a smart monitoring system help maximise
operating economy.



Star shaped nozzle.

High precision dot control.



BJC-8200.

Lower-level technologies.

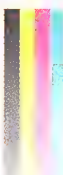
**1200 x 1200 dpi, super low
density ink.**

Precision placement allows 1,440,000 dots
per square inch using inks approximately
1/4 the density of normal inks.

This gives an apparent dot size
corresponding to 0.67pl of



regular ink, enabling
photo printing equivalent
to approximately 1800 dpi.

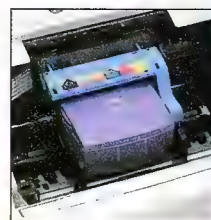


**SuperPhoto mode,
33 tonal levels.**

In SuperPhoto mode the
BJC™-8200 can print up to 42 ink
droplets per pixel (dot). This allows the printer
to achieve 33 tonal levels with zero graininess,
even in highlights or gradations where dots
are normally distinguishable.



SuperPhoto mode
with 33 tonal levels.



An optional
scanner cartridge
delivers resolutions
up to 600 dpi.



Parallel and USB
interface. Both ports
are built-in for
Windows and Mac.*

BJC-8200
Just \$699^{RRP}

Canon Customer Care.

The one-year warranty is upgradeable
to three years for a minimal charge, and
is backed by Customer Care hot-line support.

For more information call 1800 021 167.



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www.laplink.com and installed on both PCs. The download is bothersome to repeat for each PC.

Note that if you have a network connection, you will need to assign a unique IP address to the USB Network Cable on each computer to avoid conflicts. Documentation explaining this was not in our review copy but will be in newer shipping versions, as well as

at laplink.com.

We tested LapLink Gold's file-transfer speed in several modes: over a 100Base-T network and with the USB and serial cables provided. Not surprisingly, the network proved to be the fastest, transferring our 646MB test folder in 9 minutes 42 seconds, or just about 9.3 Mbps. With the USB cable, the folder took just under 30 minutes, at 3Mbps. The serial

cable obviously provides a much slower connection, with our test folder taking 9 hours 38 minutes to transfer.

We like the inclusion of all of the requisite cables, as well as the remote-control capability in this new version of an old favourite. Still, LapLink Gold falls just a bit short of being perfect because of its USB networking woes. And though the short Quick Start booklet is

sufficient to get you going, the 168-page manual is in PDF format.

We've always found a need for our copy of LapLink, and sooner or later, we bet that you will, too.

LapLink Gold

Price: \$310. Pacific Mobile Link. Ph: 1800 129 5351; Fax: 1800 129 536; www.pacificmobilelink.com
RATING: ●●●●

Wacom's Fabulously Flat PL500

BY SALLY WIENER GROTTO

Although standard graphics tablets are indispensable for professional illustration, image editing, and other graphics work, ultraprecision has been difficult to achieve because of the high degree of hand-eye coordination required to draw on a tablet while watching your progress on a monitor.

The Wacom PL500 LCD Pen Tablet System eliminates this awkwardness by permitting drawing or tracing directly onto an image displayed on a 9- by 12in colour LCD panel. Once you've worked with the PL500, you'll never want to go back to using an ordinary graphics tablet. The PL500, however, is very pricey, and setting up the required dual graphics card should only be done by an experienced technician.

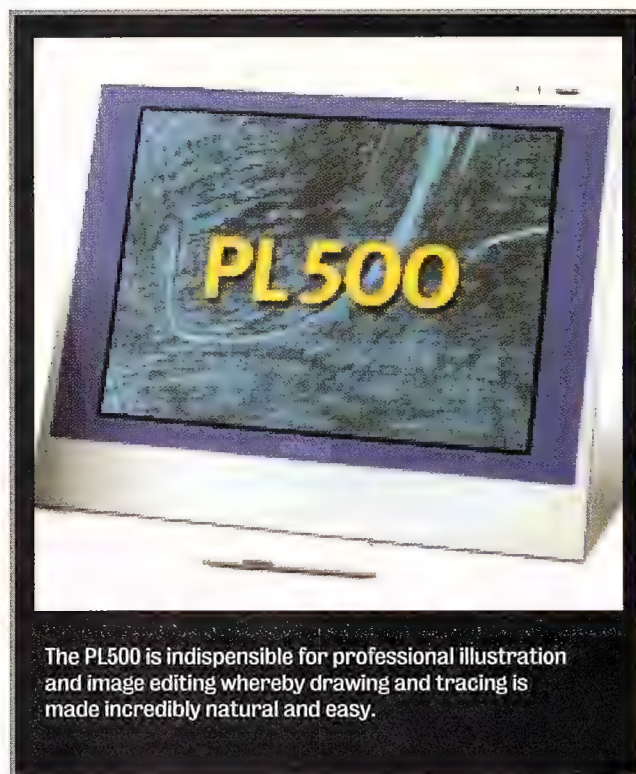
The PL500 is a flat LCD monitor designed to lie on its back. A handsome, rock-stable unit, it has a 15in active matrix colour TFT screen. Forty-seven easel adjustments let you slant the tablet to the most comfortable drawing position. On the tablet's back is a difficult-to-open flap covering

the power, USB, and graphics cable plugs; the power switch and status lights are in the upper-right corner. The only control on the tablet is a brightness knob. Depending on your graphics board, you may be able to adjust the contrast and—to a limited degree—colour.

The 24-bit colour LCD panel features 256 levels of pressure sensitivity and 1016-lpi resolution. The cordless, batteryless two-button stylus has a pressure-sensitive electronic eraser.

Although Wacom furnishes the same driver used by its Intuos tablets, the PL500 operates only with the provided pen and not with Intuos products such as a puck or airbrush. The tablet, however, peacefully coexists with any mouse. Though Wacom provides a holder, there's no indent or well on the tablet to store the pen.

You can set up the PL500 as an independent, dual, or mirrored monitor. Once we configured the Matrox Millennium G400 (one of a few recommended dual-monitor AGP graphics cards), we had no difficulty



The PL500 is indispensable for professional illustration and image editing whereby drawing and tracing is made incredibly natural and easy.

attaching and installing the USB tablet. Calibrating the stylus to display positioning is also simple, and drawing is incredibly natural and easy. Your creation displays instantly under the pen. The only caveat: the PL500's colours are unrealistic, which is why we frequently glanced up at our calibrated monitor.

The PL500 system is a fabulous professional tool that brings high-end workstation functionality to the PC.

Wacom PL500 LCD Pen Tablet System

Price: ERP \$9400. VideoBytes. Ph: 03 9348 9177; Fax: 03 9348 9533; www.videobytes.com.au
RATING: ●●●●

Portable, cordless, small and smaller. From \$399.^{RRP}

WONDERFUL IDEAS FROM CANON for people needing a portable printer. Choices in size, weight and performance enhancement.

BJC™-85. Super powerful portable printer, international adaptor standard.

It fits easily into a briefcase, but offers desktop quality and flexibility. An international power adaptor is standard and a sheet feeder is built-in. IrDA 1.1 plus parallel and USB interfaces for printing from Windows, Windows CE and Mac are standard. Gold standard photographic printing via PhotoRealism™ and a long-life NiMH battery kit are available as options².



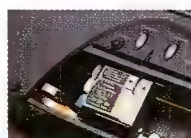
BJC - 85
Just \$399^{RRP}

High quality colour, high speed black and white.

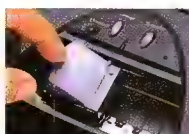
A four colour print head with resolution up to 720 x 360 dpi comes as standard. Both printers accept an optional dedicated black ink cartridge with 128 print nozzles for print speeds up to 5 ppm³.

High speed black.

Four-colour print head.



Optional colour scanner cartridge for images, fax and OCR.⁴



Totally cordless operation. Battery packs¹ and built-in infrared (IrDA) interface work with suitably equipped notebooks or PC's to print without needing interface or power cables.



BJC™-50. Ultra small, ultra light, built-in Li-ion battery.

Weighing only 900 grams, the BJC-50 is approximately ½ the size and weight of the BJC-85. Using the included battery and IrDA interface it is capable of cordless communications out of the box, and offers a host of performance enhancements similar to the BJC-85.²

BJC - 50
Just \$649^{RRP}

Exceptional colour reproduction, automatically.

Using standard inks optimised for plain paper, both printers automatically print high quality images using special functions included in the printer control software. Drop Modulation Technology™ uses variable ink drop sizes to smooth colour and tonal gradations.

Photo Optimiser adjusts for defects in exposure, highlights and shadows and prints accordingly.

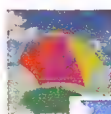
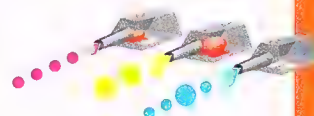


Image Optimiser can "correct" low-resolution Internet images up to the printer's maximum resolution. You can print banners up to 6 A4 pages long, envelopes and overhead transparencies.



Variable ink-drop sizes.

Canon Customer Care.

The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.



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An absolute knockout, the PS2 boasts the most powerful gaming engine currently on the market, plus the ability to play DVD movies and audio CDs.

PS2: It's Here!

BY PETER BROWN

After months of hype, claims of lagging stock levels and anxious faces amongst the local gaming community, PlayStation 2 has finally gone on sale in Australia.

Sega opened its assault on the home PC last year when the Dreamcast shipped with Internet access capability. But the introduction of Sony Computer Entertainment's PlayStation2 is likely to have an even greater effect on potential home PC buyers. Although the PS2 doesn't ship with Internet access capability (expected as an add-on in the first half of 2001), it does boast the most powerful gaming engine currently on the market, plus the ability to play DVD movies and audio CDs, the sheer entertainment value of the PS2 is a knockout.

The black PlayStation2

case measures 8.89 x 30.4 x 17.7cm (HWD) and weighs 2.26kgs. Unlike typical lightweight game consoles, the PS2 feels substantial and looks like an expensive home entertainment component. The system ships with a single analogue DualShock2 controller, AV cable with RCA video and stereo audio plugs, and an instruction manual. No games, movies, or audio CDs are included.

On the front of the case are two memory-card slots, two controller ports, two USB ports, one i-Link (IEEE 1394) port, the disc tray, and the Reset and Media Eject buttons. On the back you'll find the power switch, an AV output port (optional cables support S-video or component AV), an optical/digital/audio port, and an expansion bay intended for a hard drive to

be released in the future. In addition to supporting games written for the PS2 (it's also backward-compatible with original PlayStation media), the system supports DVD-ROM, DVD-Video, CD-ROM, DTS, and Dolby Digital media.

The ports and expansion bay suggest this same device may be used in the future for broadband Internet access and as a video recorder for television content. For now, however, the PS2 is a super game console and a fine DVD and audio CD player.

Sony's DualShock2 controller included in the package is a big step above the digital controller bundled with the original PlayStation, which had only two analogue controls. All buttons except Start and Select are analogue on the new controller, which provides more precision when playing games. Between 20 and 25 games will be available, we tested EA Sports' SSX, Namco's Ridge Racer V, Infogrames' Unreal Tournament, and KOEI's Dynasty Warriors 2.

The PS2 is without a doubt one monster of a game system. Using the 128-bit Emotion Engine as its core graphics processor, the PS2 can handle a beefy 66 million polygons per second (double the Sega Dreamcast's 33 million polygons). When we played Unreal Tournament on the PS2 with a USB keyboard and mouse, the devices were recognised immediately and worked as dual controllers. You can also connect two systems via the i-Link port for network play (we couldn't test this feature because no one we knew had a PS2).

As with other video game consoles, game software requires no user setup. Of the four games we tested, SSX was the most impressive, with incredibly detailed and lifelike graphics. Like Dreamcast games, at default system settings PS2 games consistently show jaggies (rough edges that look out of place on a smooth 3D model). While jaggies don't hinder game play, they are quite noticeable and unattractive. If you turn on the anti-aliasing option via the PlayStation2 OS driver menu, the jaggies are reduced.

Playback image quality of DVD movies on the PlayStation2 is much sharper than on a PC, as good as on standalone DVD players, with all traces of artifacts removed. Sony's inclusion of this feature is sure to build a large user base quickly, as it has in Japan. You can also play audio CDs.

Dreamcast is the PS2's only real competition now, although Nintendo's Gamecube and Microsoft's Xbox promise to bring more competition in late 2001.

As a game console the PlayStation2 kicks the pants off the competition, with superb graphics and audio. If you don't have a standalone DVD player, it does that job well, too. PS2 units may be hard to get, with additional hot features such as the hard drive and broadband adaptor yet to come, but we'd suggest picking up the first PS2 you can find.

Sony PlayStation2

Price: \$749. Sony. Ph: 02 9878 9712;
Fax: 02 9888 6264;
www.sony.com.au
RATING: ★★★★★

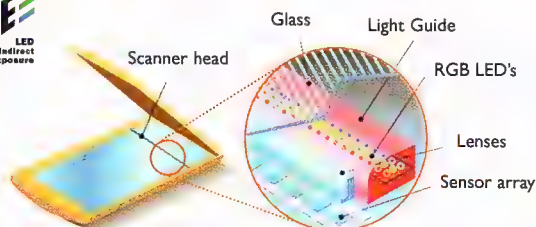
It's not just a scanner, it's a Canon for only \$119.^{RRP}

SLEEK, SIMPLE TO USE scanners with patented LIDE Technology, pass-through parallel connection and full software suite.

Introducing LIDE.TM

LIDE (LED Indirect Exposure) fundamentally changes the way scanners work, and their price/performance ratio. LIDE eliminates the need for costly, complex optical mirrors, while it maintains image quality and colour clarity in two super slim, sleek scanners.

The CanoScan N340P (300 x 600 optical dpi) and CanoScan N640P (600 x 1200 optical dpi).



300 x 600 dpi

CanoScan N340P
Just \$119^{RRP}

Getting started is remarkably easy.

Your scanner plugs directly into the parallel port, or hooks up as the middle link between a printer and your PC. Quick-and-easy CanoScanTM Setup installs the included software, and you're ready to make your first scan with Windows 95/98/2000/NT 4.0.

Full software suite, 42-bit colour input.

The CanoCraft CS-P software works for both stand-alone image acquisition, and as a TWAIN driver for other applications. Advanced controls for colour matching and image definition allows various

pre-scan settings such as selecting the scan area and adjusting resolution up to 9600 dpi² with up to 42-bit colour input. The software package also includes ArcSoft PhotoStudio 2000 for photo-editing and Caere OmniPage Pro for converting scanned documents into editable text data, plus a CD ROM with user's manual.

CanoCraft makes high quality colour easy.



Easy to use.

The ScanGear Toolbox (pictured above) lets you select functions and the final destination of your scan such as printer, e-mail program, fax, copy or others,¹ and automatically makes settings for you.



LIDE technology allows a smaller, sleeker design.



600 x 1200 dpi

CanoScan N640P
Just \$149^{RRP}

Canon Customer Care.

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Canon Perfecting Photo Performance

BY LES FREED

The Canon EOS D30 sets a new price/performance ratio for interchangeable-lens digital SLRs. The D30 was built from scratch as a digital camera, like Nikon's more expensive D1. Comparisons to the D1 are hard to avoid, because both cameras represent their maker's current lowest-priced digital SLR, and the D1 costs nearly twice as much as the D30. But price isn't everything: we were also impressed with the D30's handling, image quality, ease of use, light weight, and feature set.

Key controls are grouped around the rubber-coated hand grip, and a large LCD panel on top of the camera shows exposure, flash settings, and the number of pictures remaining. A door on the right side of the camera opens to reveal a single Type II

CompactFlash card socket, and a door on the left side of the camera hides the USB and video-out connectors.

The D30's rear panel features a bright 1.8-inch TFT display, an on/off switch, and Canon's trademark control dial. The dial navigates through the D30's menu system, and a button in the middle of the dial lets you select an option without moving your thumb. The control dial is also used to navigate through image playback. Other tools include a magnifier, a 9-thumbnail image preview, and an info screen that shows exposure data and a histogram for each image.

The D30 is always ready to shoot a picture, even if you're reviewing images. A light press on the shutter release button takes the camera out of image playback mode and immediately returns to shooting

mode.

Unlike many digital SLRs, the D30 is light and responsive, thanks to lightweight construction materials and a lithium ion battery. Canon provides one battery and a two-bay charger with the camera; an optional battery grip is also available. The grip attaches to the bottom of the camera and accepts two battery packs, doubling the operating time. The grip includes a second shutter release for shooting vertical shots.

Since it is an EOS-family

camera, the D30 accepts all of the more than 70 Canon EOS lenses. We tested the D30 with a variety of lenses, ranging from 20mm all the way up to 400mm. All performed flawlessly. Picture quality was excellent, and the D30's autofocus and auto-exposure systems worked well in a variety of difficult lighting situations.

Canon EOS D30 Digital SLR Camera

Price: ERP \$6000. Canon. Ph: 02 9805 2000; Fax: 02 9888 3650;

www.canon.com.au

RATING: ★★★★★

The D30's handling, image quality, ease of use, light weight, and feature set, amounts to one digital SLR camera with many impressive qualities.



Keyboards: Alive and Kicking

BY BRUCE AND MARGE BROWN

The HP Jornada 720 Handheld PC, a lightweight notebook alternative that weighs just 632 grams, upgrades the HP Jornada 600 series by adding a 32-bit 206MHz Strong ARM processor, a 51-MHz data bus, and a 2D graphics accelerator.

Rated at nine hours, the 720's rechargeable lithium ion battery lets you accomplish a day's work. Mobile

professionals can back up files to external media and connect to an ISP or to e-mail or network applications with an analogue phone line connection to an internal 56K modem.

Open the 720's dark grey case (3.3 x 18.7 x 9.3cm HWD) and you'll find a bright, 6.1 inch-diagonal touch screen that provides 640 x 240dpi resolution with 65,536 colours. You can easily manage light typing tasks with the compact, comfortable keyboard and customisable hot keys.

Notable hardware features include 32MB of flash memory, a Type II PC Card slot, a speaker, a microphone, an infrared port, status LEDs,



With the HP Jornada 720, you get notebook functionality as well as improved portability.

audio control buttons, a SmartCard reader for security, a redesigned Type I CompactFlash card slot, and an AC adaptor. You can connect the 720 to a PC serial port or use the included docking station for either a serial or USB port connection (serial cable included).

The 720 runs Microsoft

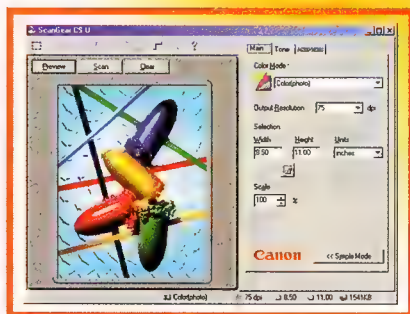
Windows for Handheld PC 2000 3.0 OS, Microsoft Internet Explorer for H/PC 4.01, and Windows Media Player. Microsoft's standard Pocket applications are supplemented by nine HP utilities, such as QuickPad for capturing miscellaneous text for exporting to Pocket Outlook or Pocket Word.

Plug and play USB, push button simplicity 600 x 1200 dpi, just \$189.^{RRP}

THE MOST COMPACT flatbed scanner on the market, 600 x 1200 dpi, 42-bit colour input and push button simplicity.

Push button simplicity, unconventionally silent.

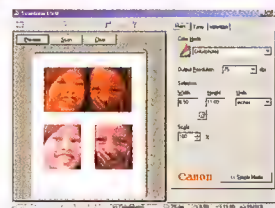
A one touch scan button activates ScanGear Toolbox CS (the scanner control software).



It lets you select functions and the final destination of your scan such as colour printout, e-mail program, fax, copy or others,¹ and makes the necessary settings for you.

Edit and store photos easily.

ArcSoft PhotoStudio 2000 is an easy to use image editor, and ArcSoft PhotoBase



creates photo databases. Adobe Acrobat Reader and PDF manuals for Windows and Mac are included.

High powered scanning with LIDE.

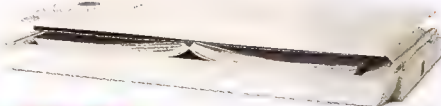
Patented LIDE™ technology delivers optical resolution up to 600 x 1200 dpi with 42-bit colour input. ScanGear CS offers direct scanner control and is a universal TWAIN driver for other applications.



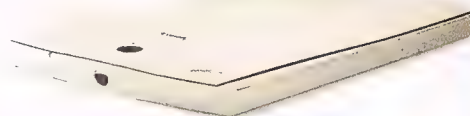
It lets you make pre-scan settings such as selecting the scan area and adjusting resolution up to 9600 dpi.²

Plug 'n play USB for Windows and Mac.

The USB interface is compatible with Windows 98/2000 and Mac OS 8.5 or higher.³ It lets you plug in or disconnect your scanner without having to turn off your computer first. And, because the scanner is powered directly through the USB cable, it does not need a separate AC cable.



"Z-lid", advanced OCR. This special lid simplifies book scanning and OCR with the bundled Caere OmniPage Pro⁴ converting scanned text into editable data.



CanoScan™ N650U
Just \$189^{RRP}

Canon Customer Care. The one-year warranty is upgradeable to three years for a minimal charge, and is backed by



Customer Care hot-line support. For more information call 1800 021 167.

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In testing, the PC synchronisation worked flawlessly. We connected easily to an ISP via the Remote Networking New Connection wizard. HP's Dialup 2.0 wizard is more powerful, but we disliked the way it automati-

cally restores the default settings if a good connection isn't made on the first attempt. The browser did a great job of displaying the demanding PC Magazine site but was unable to display surround videos on Microsoft's

own CarPoint site.

With the HP Jornada 720 Handheld PC, you get notebook functionality plus improved portability. When optimised with accessories and add-on software, its usability increases exponen-

tially. Who said that keyboards are dead?

HP Jornada 720 Handheld PC

Price: ERP \$1999. Hewlett-Packard. Ph: 13 24 26; Fax: 02 9354 7766; www.hp.com.au
RATING: ●●●●●

Death of the Salesman

BY XAVIER W. NIZ

Though the travelling encyclopaedia salesman is long gone, a good set of reference materials is still important. For \$199, Microsoft's Encarta Reference Suite 2001 puts more than 225,000 articles, 80,000 sound clips, and 25,000 photos within your grasp.

At the heart of the suite is Encarta Encyclopedia Deluxe 2001. The articles are written in a lively, informative style, and the program's clean, straightforward interface makes it easy to navigate Encarta's vast resources. The Pinpointer function, for instance, lets you use keyword phrases or plain-language questions to find information.

Also included on the set's seven CDs are a world atlas and a dictionary. Each application shares a browser-like interface, so it's easy to switch from one program to the next. Unfortunately, this interface can get crowded

with numerous windows showing related articles, multimedia clips, and Web links. Also, though Microsoft eliminates the hassle of swapping CDs by allowing you to install the encyclopaedia and atlas on your hard drive, copying the dictionary proved tougher; you'll still need the disc to access some functions.

Encarta Reference Suite 2001 does an exceptional job of integrating Internet content. The new Web Center lets you access more than 20,000 editorially screened Web links, browse a Web directory for any topic, or freely search the Internet. And the new Encarta Today feature integrates information about current events from the Internet into a dynamic section of the encyclopaedia.

Minor annoyances aside, Microsoft Encarta Reference Suite 2001's sheer volume of information makes it a must-have program for your family's PC.

Microsoft Encarta Reference Suite 2001

Price: \$199. Microsoft. Ph: 13 20 58; Fax: 02 9805 1108; www.microsoft.com RATING: ●●●●●



The 3310's messaging capabilities are a standout feature, not to mention voice dialling and game capabilities.

Phone Frenzy

BY PEITA DUGGAN

Nokia's latest addition to their range, the 3310, may not be as tiny as the 8210, but its impressive messaging capabilities, along with an appealing features set, make the 3310 a communication powerhouse.

Measuring 113 x 48 x 28mm (HWD) and weighing just 133 grams with the battery, it is certainly not a burden on the pocket. According to Nokia, the rechargeable NiMH battery gives up to four and a half hours of talk time and approximately 260 hours of standby time, and we found nothing to disprove this fact.

What really makes this phone a standout are its mes-

saging capabilities. Similar to an online chat, the Mobile Chat feature allows you to chat via SMS to multiple friends simultaneously, you can even give yourself a nickname. The 3310 can also send a single message to several people at once, just like sending an e-mail to a group. And to make messaging just a little easier, you can save messages as templates if the message is something you send frequently.

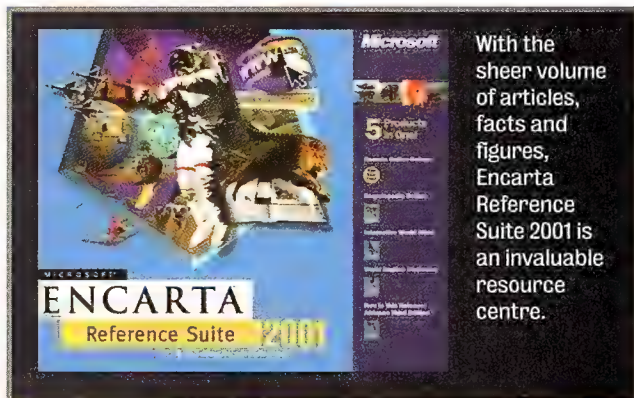
The 3310 also has thirteen picture messages, but you can download more from the Web. This also can be done with the 3310's screensavers. These display whilst the phone is in Standby mode, and include Rock n' Roll dancers and coffee cups.

Other impressive features of this phone include Voice Dialling, message dictionary, vibrating ring tones, a currency converter, four games, and interchangeable "Express-on" covers. These are available separately for \$21.50 and come in red, yellow, silver, blue, grey and white.

The full kit includes the phone, battery and a charger. Spare batteries and car kits are available separately. The Nokia 3310 is available now from most mobile phone outlets.

Nokia 3310

Price: ERP \$499. Nokia. Ph: 1300 366 733; Fax: 02 9274 0888; www.nokia.com.au
RATING: ●●●●●



Super high resolution in a super sexy scanner, just \$299^{RRP}

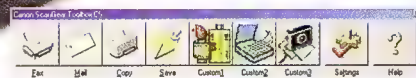
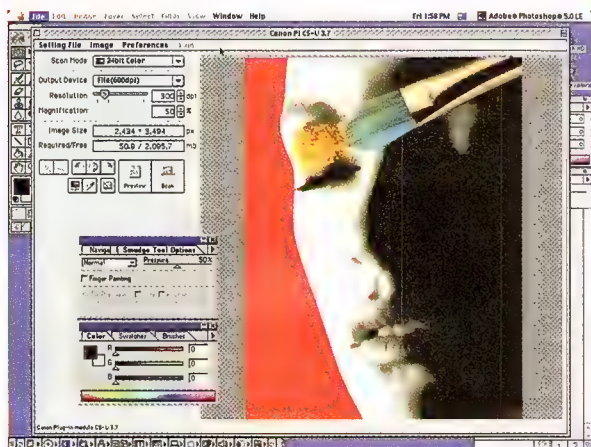
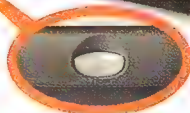
SCANNER BREAKTHROUGH. 1200 x 2400 dpi, 42-bit colour input and LIDE technology in an ultra compact case.

Semi-professional scanning with LIDE.

Canon's patented LIDE™ was a flatbed scanning breakthrough that changed the price/performance ratio while maintaining image quality and colour clarity. The CanoScan™ N1220U, with 1200 x 2400 optical dpi and 42-bit colour input, demonstrates the evolution of this technology, delivering "semi professional" quality in a super slim, super sexy looking case.



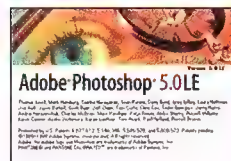
42
bit input



Simple, professional quality software.

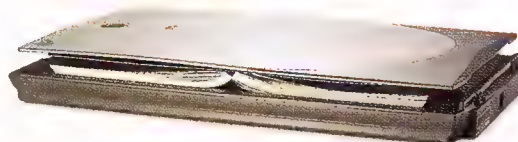
The one-touch scan button activates ScanGear Toolbox CS to select functions and the destination of your scan such as colour print out, e-mail program, fax, copy or others,¹ and makes the necessary settings for you. ScanGear CS offers direct control for pre-scan settings such as selecting the scan area and adjusting resolution up to 9600dpi.²

It is also a universal TWAIN driver for applications such as the bundled Adobe Photoshop LE, a limited edition of the world's most popular image editor.



CanoScan N1220U

Just \$299^{RRP}



"Z-lid", advanced OCR.

This special lid simplifies book scanning for OCR with bundled Caere OmniPage Pro⁴ to convert scanned text into editable data.

Edit and store photos easily.

ArcSoft PhotoBase creates electronic photo albums. ArcSoft PhotoStudio allows easy image editing.



Canon Customer Care.

The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.

Plug 'n play USB for Windows and Mac.

The USB interface lets you plug in or disconnect your scanner at any time without having to turn off your computer first.³ And, because it is powered through the USB cable, the scanner does not require an AC cable.



Canon

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Adobe Adds to its Family

BY LORI GRUNIN

We may quibble with some of the superficial ways in which Adobe updated Photoshop from 5.5 to 6.0, but we certainly can't complain about the results. Based on the beta version we tested, we think that print and Web graphics producers will greatly appreciate the productivity improvements. However, casual users may finally find themselves a bit over their heads.

The overhauled type engine represents one of the most broad-based improvements to the product: it offers most of the type tools available in illustration and desktop-publishing apps including paragraph text, hyphenation and justification, single- or multiline-composer layout options, baseline shift, and on-page text editing. In addition, Adobe has streamlined the Effects and Adjustment layer interface to give you one-click access to the different settings, as well as the ability to save Effects layer settings as Layer Styles. Unfortunately, the "one efficient dialog" for Layer Effects dialog is so large it obstructs most of the image, so you can't easily preview changes—the collapsible palette in ImageReady works better. Other crowd-pleasing tools include Liquify, an interactive image-warp filter that, strangely enough, doesn't appear on the "Filter" menu. The Liquify algorithms impressed us: we gave a digital porcupine a perm, bigger eyes, and longer teeth without noticing any artifacts when we printed it on an Epson Stylus Photo 2000P.

We also welcomed the new crop tool that hides areas that have been cropped out (which gives you a better sense of how the new image will actually

look) and—finally—a print preview. One of the most important new features is the support for vector "shapes". Although everyone ultimately benefits from Photoshop's newfound capability to store vector paths as layer objects, print folks will be most pleased: now you can output clipping paths at output resolution automatically instead of rasterising them. Combined with the abilities to save PDF and TIFF files as multilayered documents with annotations and workflows with check-in and check-out, the program makes file exchange, soft-proofing, and collaborative creation much more accurate and effective. We don't dispute the usefulness of the shapes tool, but we do take issue with the implementation. When you create a square shape, for example, the program actually creates a square clipping path linked to a new layer. In order to "fill" the square with a colour, you fill the entire layer with the colour. This means that cutting and pasting simply don't work intuitively anymore. On one hand, this provides a natural programmatic transition between Photoshop's existing Paths and the idea of objects: you can save any Path as a shape. Furthermore, there are certainly precedents for this implementation. But you can't automatically save Paths as shapes. The option to do that is under the "Edit" menu rather than off the "Path" palette, and many so-called "advanced" Photoshop users have never even used Paths. As a result, the implementation poses a usability and learning-curve issue for both new adopters and upgraders.

All the new Web tools contribute to the program's new level of complexity as well, but

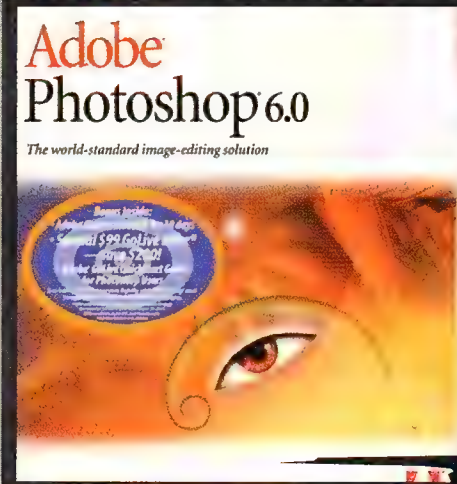
we doubt we'll hear a disgruntled peep from anyone using Photoshop for high-volume Web graphics production or who generates graphics for both print and Web publishing. You can now define slices within Photoshop, and, even better, now you can automatically generate slices within the bundled copy of ImageReady 3.0 based on your Photoshop layers.

This means, however, that you need to pay more attention to your file architecture than you might have in the past. But it's worth it, because when you combine it with the ability to save rollover behaviours as part of a layer style, you can shave hours off your design time. In fact, we created a fully functional nav-bar this way in less than five minutes. Then we saved all the

tion you wish to set individually.

We're also glad to see Droplets finally turn up in Photoshop, along with the essential Fit Image command—which you'll find buried in the Automate menu. Droplets let you save EXE versions of Actions, and you can then drag and drop files from Explorer onto the Droplet to perform batch operations. Fit Image is a subtle little tool that automatically resizes an image to fit within a given size. It lets you resize an image to fit either its horizontal or vertical constraint in a single step, which is another combination destined to shave hours off high-volume Web-graphics production.

Finally, a word on colour



Adobe Photoshop 6.0
The world-standard image-editing solution

With Photoshop's capability to store vector paths as layer objects you can now output clipping paths at output resolution automatically instead of rasterising them.

nav-bar slices as a set and exported only those slices to HTML—ready to reuse elsewhere across a site.

Furthermore, Photoshop now allows you to specify different optimisation parameters for each slice—sort of. We used GIF on all the slices with text, then set the rest to a highly compressed JPEG. To set varying levels of JPEG compression throughout the image, you must create an alpha channel for each sec-

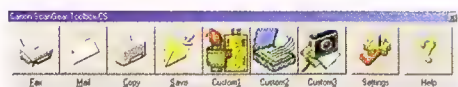
management—Adobe thankfully hasn't touched it this time. The interface has changed for the better, however: it's now easier to determine exactly what your profile status is for any given image, and to quickly change for different output devices.

Adobe Photoshop 6.0

Price: ERP \$1400; upgrade from versions 4 and 5.5 ERP \$417. Adobe. Ph: 02 9778 4100; Fax: 1300 550 405; www.adobe.com.au RATING: ●●●●

Combined print and film scanner with USB, surprisingly low \$299.^{RRP}

BUILT-IN FILM SCANNING up to 1200 x 1200 dpi plus high quality photo scanning in an easy to use scanner.



Easy to use print and film scanner with USB.

The CanoScan™ D660U solves diverse scanning needs simply.

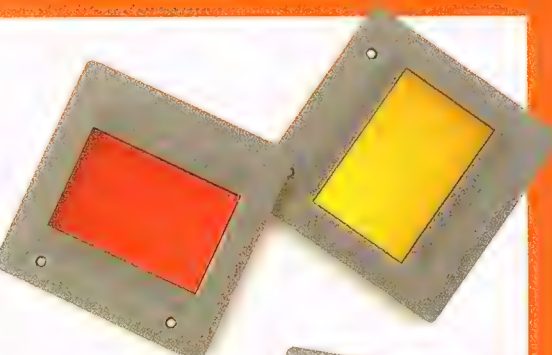
No adapters or add-on kits. Everything is built-in, and is available with the push of a button, one for photos, and one for 35 mm positive or negative film in either slide or roll format. For beginner controls, ScanGear Toolbox lets you select functions and the final destination of your scan such as printer, e-mail program, fax, copy or others.¹ Or, direct driver control lets you adjust scan size, resolution, and other parameters. The USB interface connects to either Windows 98/2000 or Mac OS systems.²



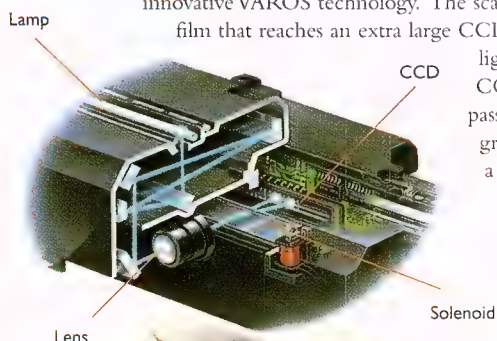
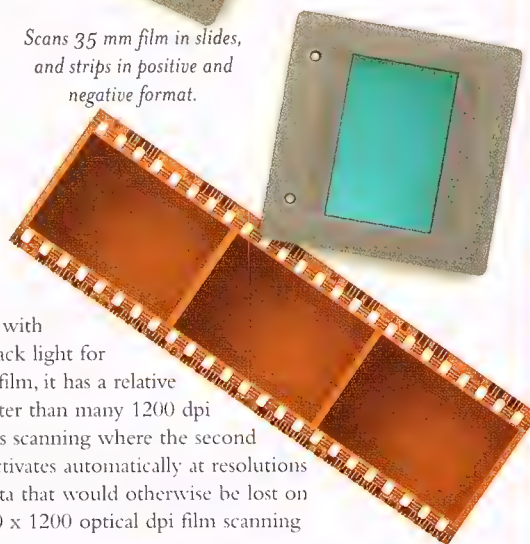
Superior 35 mm film scanning with VAROS.TM

Continuous tone colours in film pose challenges. Canon solves them with innovative VAROS technology. The scanner cover includes a built-in back light for film that reaches an extra large CCD sensor. Much like high-speed film, it has a relative

light sensitivity up to 4 times greater than many 1200 dpi CCDs. Then VAROS uses two-pass scanning where the second pass is refracted by half a pixel. It activates automatically at resolutions greater than 600 dpi, capturing data that would otherwise be lost on a lesser scanner. The result is 1200 x 1200 optical dpi film scanning in less space and lower cost.

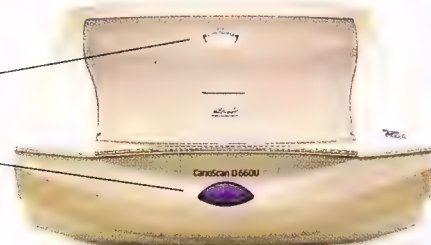


Scans 35 mm film in slides, and strips in positive and negative format.



Push for film scanning

Push for photo scanning



Edit and store photos easily.

ArcSoft PhotoStudio 2000 provides tools for editing photos, and ArcSoft PhotoBase creates an electronic photo database. Also included are Caere OmniPage Pro for OCR³ (optical character recognition), plus Adobe Acrobat Reader and PDF manuals for Windows and Mac.

CanoScan D660U

Just \$299^{RRP}

Canon Customer Care.

The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.



Advanced photo scanning and colour capture.

Photo print and text scanning resolution goes up to 600 x 1200 optical dpi with 42-bit colour input capable of capturing more than 4 trillion colours. Data can even be software enhanced to 9600 dpi.⁴

Canon

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Full Speed Ahead

BY ALFRED POOR

The Ricoh MP7120A sets up fast and runs even faster, providing top performance for writing and rewriting CDs. But the bundled software for creating audio and data CDs rates as merely adequate, not top of the line, and comes without printed documentation. It's good value, but unless you've got a burning need for speed you can save a few bucks by going with a drive that is only slightly slower.

Calling the Ricoh MP7120A a fast CD-RW is a bit like calling the Concorde a fast aeroplane. Rated at 10x/12x/32x (CD-RW write/CD-R write/CD-R read) maximum speeds, that translates to up to 4.8MBps for CD-ROM reads. At just \$599, you only pay a small premium for this top performance. On the other hand, the extra speed requires special recording media and doesn't save you a lot of time on a per disc basis.

The key feature here is speed, but it pays to know what you're getting. The CD-

R write rate is the most interesting spec, because that's

what you'd use for burning music CDs and data discs. The 12x rating translates to 1.8MBps, and the drive's actual 1.57MBps came close in our tests. However, consider how much this extra speed saves you. It took about 6.5 minutes to burn a 632MB CD. If you assume that a drive rated at 10x would be proportionately slower, then it would take about 8 minutes to burn the same CD on the slower drive—a saving of less than 1.5 minutes.

As with any high-speed drive, the CD read speed varies depending upon the location of the track being read, and the actual data transfer rates tend to be much lower than the maximum rating; you only approach max at the outer tracks of a full disc. Reading a CD-R containing 301MB of data (a bit less than half the capacity), the drive averaged 2.43MBps, which is about 16x or half the maximum rating. Similarly, CD-RW performance came in at 1.19MBps

on our tests, which works out closer to 8x speed than the 10x (1.5MBps) rating.

Physical installation is simple: set the Master/Slave jumper, find an open EIDE cable connector, plug in a power connector, boot up Windows and you're off and running—Windows already has the necessary drivers. The single-sheet installation instructions are sparse but adequate. Unfortunately, the only additional documentation is on CD, and it can be difficult to navigate.

The bundle includes two software programs from Prassi. abCD provides packet-writing support for CD-RW drives, and Primo CD Plus lets you create music and data CDs. The documentation comes only on disc.

and while these programs work, neither is as easy nor as versatile as some competing products, such as Adaptec's Easy CD Creator.

A slower drive might cost less than the MP7120A, and only take a minute or two longer to burn your CDs. If you're a budget buyer, you may want to think about how much those minutes are worth to you. If you want to burn full speed ahead, however, the Ricoh MP7120A will get the disc done in the least amount of time, and at a reasonable price for the performance.

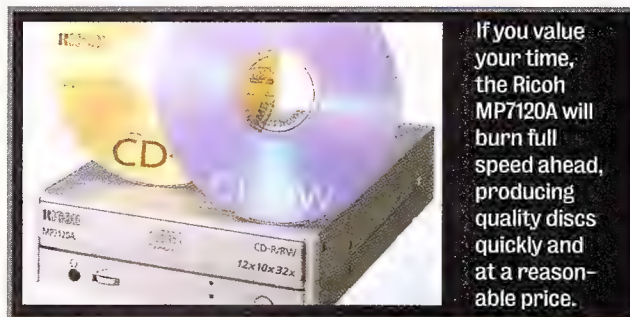
Ricoh MP7120A CD-RW

Price: \$599. Ricoh. Ph: 02 8977 1111;

Fax: 02 8977 1420;

www.ricoh.com.au

RATING: ●●●●



If you value your time, the Ricoh MP7120A will burn full speed ahead, producing quality discs quickly and at a reasonable price.

Documents to Go

BY BRUCE AND MARGE BROWN

Do you need to view and update documents and spreadsheets on a Palm organiser? Then install Documents To Go Professional Edition 3.0 from DataViz. Downloaded files are synchronised with your desktop with each HotSync, so that both file copies reflect edits made from either a desktop PC or a Palm device.

The application includes

Documents, a file-management desktop PC program, which is used with any of four Palm applications: WordView and SheetView (for file viewing) and WordToGo and SheetToGo (for file editing). You cannot beam Documents, but you can beam any of the other four applications with your files to other Palm users, who would need to buy the application to upload your files to their desktop PCs.

When you add a file to the desktop program, it is formatted for the Palm display and queued for the next HotSync. After editing a doc-

ument on your Palm PDA, you can replace the existing document or save the changes in a new document. If you replace the existing document, your corresponding desktop file will be replaced the next time you perform a HotSync. As a safeguard, if you change the same file on both your Palm and your desktop, Documents To Go creates a new document on both computers; you must manually merge the changes.

In our testing, we downloaded a 958KB Microsoft Excel spreadsheet with 20 worksheets and a 150KB 43-

page Microsoft Word document to a Palm IIIc, which converted to Palm-compatible format requiring 638KB and 98KB, respectively, in SheetToGo and WordToGo, and 228KB and 33KB, respectively, in SheetView and WordView. Our edits synchronised successfully.

Though the program can be cumbersome to navigate, the functionality it adds is a great benefit.

Documents To Go Professional Edition 3.0

Price: \$159. Conexus. Ph: 02 9975

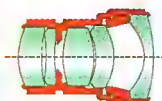
2799; Fax: 02 9975 2699;

www.conexus.com.au

RATING: ●●●●

Exceptional quality for graphics, design and web work, just \$499.^{RRP}

ADVANCED CCD, 1200 x 2400 optical dpi, fast Galileo Lens, full 42-bit colour and optional high intensity film adaptor unit.



Galileo
Aspherical lens.

High-speed Galileo Lens, advanced CCD, more optically accurate.

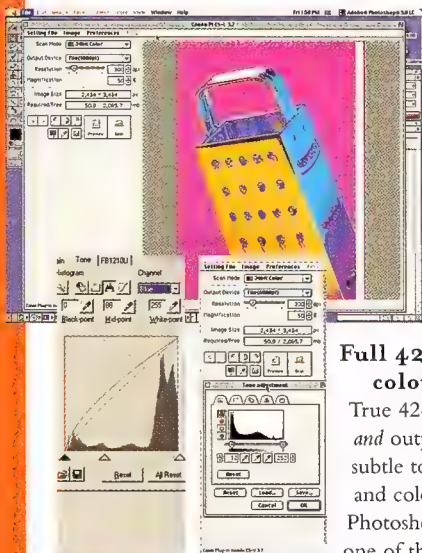
Superior performance begins with Canon's optical expertise. The five-element, aspherical lens system eliminates distortion. A shortened optical path and wide aperture lens (F-stop=5.5) increase scanning speed and improve signal to noise for a more optically accurate system. A true 1200 dpi CCD sensor is capable of finer detail and more accurate colour than "hit or miss" interleaved CCD approaches used by some competitors.



ScanGear Toolbox CS offers "point and click" simplicity.

So advanced, so simple.

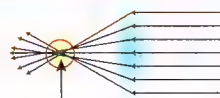
The easy to use unit delivers studio quality 1200 x 2400 dpi optical resolution for almost the same price as many 600 dpi scanners. The USB interface connects to Windows 98/2000 and Mac OS systems.¹



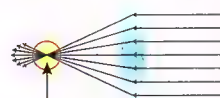
Full 42-bit colour.

True 42-bit input and output increases subtle tonal variation and colour accuracy. Photoshop 5.0LE, one of the few

applications capable of handling 42-bit colour, is included. Advanced controls cover gamma settings, histogram adjustment, colour curves and more.



Spherical aberration —
Light converges at different points.



Galileo Lens — Light converges at a single point.

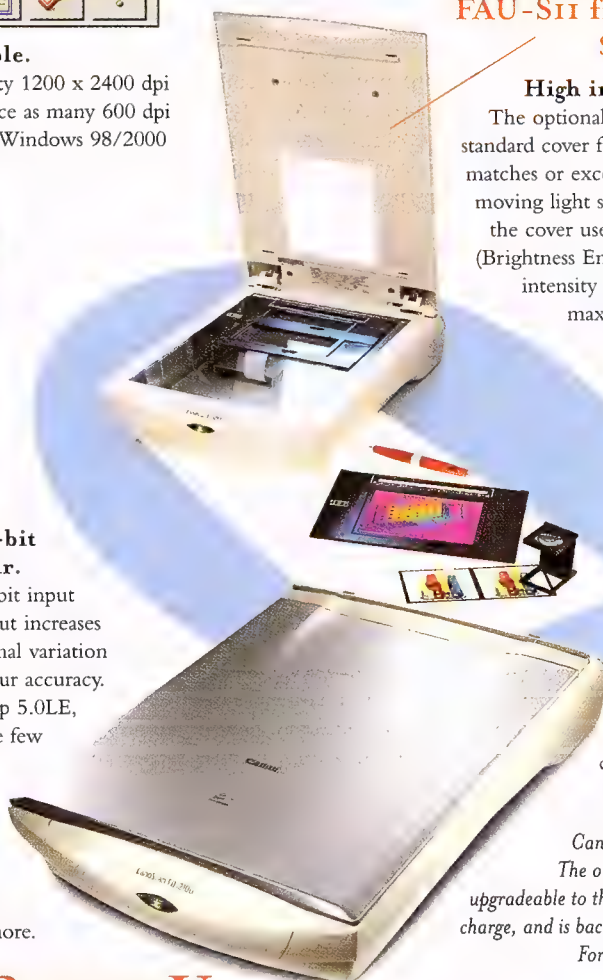
Optional FAU-S11 film adaptor, \$199.^{RRP}

High intensity film adaptor.

The optional film-scanning unit replaces the standard cover for reflective and film scanning, and matches or exceeds the performance of expensive moving light source designs. The light source in the cover uses dual sheets of 3M™ BEF film (Brightness Enhancement Film) plus dual, high-intensity cold cathode fluorescent lamps for maximum brightness. It accepts colour negatives and positives in 35 mm, 2 1/4" and 5 x 4" sizes.

Full software suite.

ScanGear control software, a universal TWAIN driver and Photoshop LE are included for Windows and Mac. Caere OmniPage LE for OCR is included for Windows. Caere PageKeeper for Windows and Caere ImageAXS for Macintosh create and access visual data bases.



Canon Customer Care.

The one-year warranty is upgradeable to three years or a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.



CanoScan™ FB I210U

Just \$499^{RRP}

Canon

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Olympus Does it Again

BY LES FREED

The new Olympus Camedia E-10 digital camera is one of those rare products that feels perfect the first time you pick it up. Even rarer is the fact that after several weeks of use, we couldn't find one major facet of the E-10 that we'd change—except the price tag.

At first glance, the E-10 looks like a traditional 35mm camera and lens, with the left side of the camera body cut off. The E-10 feels solid in the hand, thanks to a comfortable grip. It has true SLR viewing but no interchangeable lenses. The included 9 to 36mm lens (equivalent to a 35 to 140mm lens on a 35mm camera) is permanently attached to the camera. An Olympus-designed 4-megapixel CCD image sensor produces some of the best images we've seen from any digital camera under \$10,000.

The E-10's controls are laid out like a 35mm film camera, with the most frequently used controls near

your right thumb and index finger. The zoom lens is controlled by a large ring around the lens; this encourages two-handed operation, which increases camera stability and produces sharper pictures. The zoom control is butter-smooth, as is the manual focus control.

The rear panel hosts a 1.8 inch TFT colour LCD screen that does triple duty as a digital viewfinder, playback screen, and control menu screen. Unlike conventional SLR cameras that use a moving mirror to redirect the picture image into the viewfinder, the E-10 uses an image-splitter prism. This means that the image is visible to the image sensor and to the optical viewfinder at the same time. The result is that you can use the E-10's LCD screen or the optical viewfinder to compose your pictures, much like a point-and-shoot digital camera. The LCD screen is mounted on a swivel/tilt mechanism that lets you easily see the screen at very low angles, much like the tilting LCD

display on the Nikon 950 and 990 cameras.

Like the Fuji S1, the E-10

We think the E-10 will find a niche with hobbyist and business users who need



For users who require high-quality images and accurate SLR framing, there is no going past the Camedia E-10.

supports both CompactFlash Type II and SmartMedia storage. Olympus supplies a 16MB SmartMedia card with the camera, but most users will need to purchase additional storage.

The E-10 is powered by four AA batteries or by two CRV3 lithium polymer batteries (supplied with the camera). Battery life was impressive: after 300 test shots, the lithium polymer cells were still going strong.

high-quality images and accurate SLR framing without the SLR price tag—as long as they can live with the E-10's single lens. The E-10 produces pictures on a par with those of the Canon EOS D-30 or the Fujifilm FinePix S1 Pro at less than half the cost.

Olympus Camedia E-10

Price: ERP \$3999. R. Guntz Photographic. Ph: 02 9350 6600; Fax: 02 9935 6622; www.olympus.com
RATING: ●●●●●

Say "Cheese"

BY SALLY WIENER GROTTA

It doesn't get much easier than the aptly named Kodak EZ200. The shirt-pocket-size charcoal and silver camera, with 4MB of internal memory, shoots both VGA stills and up to five seconds of video (without sound). The shutter and power buttons are to the right of the control panel on top of the camera. When you use the single-mode button, the icon changes, and the camera conveniently beeps. Like its ancestors, the EZ200

makes a "ko-dak" sound when the shutter is pressed and an image captured (which is how the company got its name). The EZ200 is a bargain if you want a still camera and a Web camera in one device, but it's not our first choice for a standalone still camera.

The EZ200 makes an excellent webcam, though. Resolution, colour, and sharpness are excellent, and the camera's ability to adjust quickly to changing lighting conditions is impressive—when it's connected to the computer. But when not in webcam mode, the camera

suffers from two important drawbacks: no flash and a lens that must be put in the focus-free mode to take a shot.

The EZ200 generally adapts well to lighting conditions, but without a flash, indoor and backlit pictures can be dark and poorly exposed. And the camera is designed to focus down two inches when it's being used as a Web camera, but as a still camera, it must be used in fixed-focus mode, with no macros possible. Image quality is average or above; details are well defined, and colours are generally accu-

rate but oversaturated and somewhat contrasty.

Kodak EZ200

Price: \$299. Kodak. Ph: 1300 130 674; Fax: 03 9350 2416; www.kodak.com.au
RATING: ●●●●●



The EZ200 is a still and Web camera all in one.

Colour fax to colour fax without a computer. \$749^{RRP}



WITHOUT A PC.

The MultiPASS C70 is efficient, economical and easy to use as a stand-alone product with advanced fax, phone and copy functions.

Colour fax.

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A Few Good Pointers

Optical sensor technology has changed the feel of cursor control forever. But is that the only thing that sets these pointing devices apart? We look at the latest batch of mice and trackballs to find the top performers.

By: Kire Terzievski, RMIT IT TEST LABS



In this feature, we looked at mice that use optical technology and we also looked at a games controller. Optical technology delivers superior precision and smoother tracking than conventional mice that have mechanical moving parts—namely the mouse ball—which gets dirty quite easily and requires regular cleaning. The way an optical mouse works is through light—an oblique beam illuminates the surface on which the mouse is moving. Then, a built-in sensor observes movements of the surface through a lens and captures a picture every 1/1500th of a second. This provides smooth and precise tracking without the use of moving mechanical parts.

We looked at eleven mice in total, with prices ranging from \$59 to \$139.

A4 Tech Optical GreatEye

Price: \$59. Protac International Computers Australia.
Ph: 02 8748 8800; www.protac.com.au

The A4 two-wheel mouse looks a lot like the Microsoft IntelliMouse. It is not, however, made of quite the same high-quality materials

as the Microsoft IntelliMouse. The buttons were quite flimsy. The side thumb-buttons also make a pretty loud click once you release them. The two top buttons do not reach out to the edge of the mouse, making it a bit more difficult to find the top buttons without having to look down at the mouse.

The A4 has a PS/2 connector and uses optical technology for pinpoint accuracy. The A4 feels good and is smooth and accurate in operation. When the mouse is in action the optical sensor illuminates the mousepad area through the translucent side thumb but-

tons.

The A4 mouse also features two scroll wheels. In addition to the vertical scroll that lets you scroll up or down in a window, there is a horizontal scroll that lets you scroll left or right. The horizontal scroll control is not positioned horizontally, but rather is placed to the right of the vertical scroll button. Pressing down on the horizontal scroll button launches "Lucky Jump". Lucky Jump provides a shortcut to some useful applications and commands such as a Notepad, Windows Explorer and Run. You can also program any of the other buttons besides the top left button to launch Lucky Jump instead. The buttons can alternatively be programmed to launch Net Jump, which lets you choose from commands commonly used for Web browsing. You can even create your own Command Menu and with one click of a button you can have access to your favourite applications.

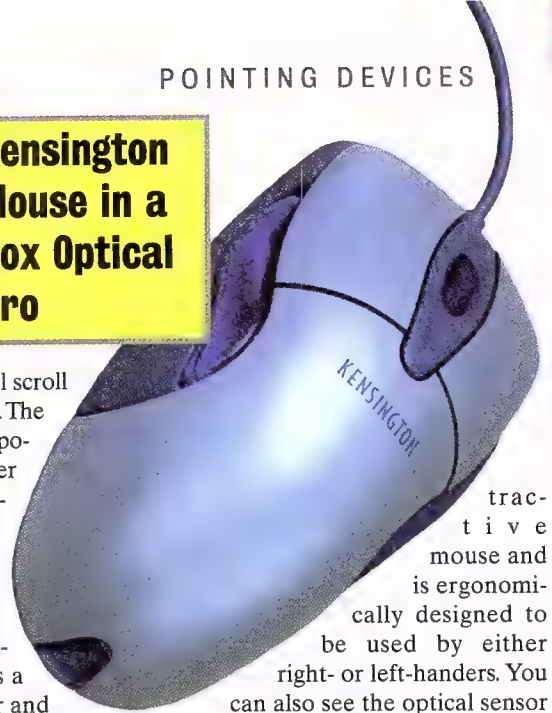
The A4 mouse lets you zoom in or out when using applications that support zooming. You can do this by activating this option through the mouse properties and then using the horizontal mouse control to zoom in or out. You can also automatically scroll through large documents by activating AutoScroll from Lucky Jump or Net Jump. For only \$59 the A4 mouse is competitively priced but it's not quite up to the standard of the more expensive mice we reviewed.

Kensington Mouse in a Box Optical Pro

Price: \$79.95. ACCO Australia. Ph: 02 9700 0180; www.kensington.com

The Kensington Optical Pro is a four-button mouse with scroll wheel. The Optical Pro has a cool blue and metallic-textured exterior. It has two blue translucent buttons on each side of the mouse and two metallic buttons located on top of the mouse. It is quite an at-

Kensington Mouse in a Box Optical Pro



tractive mouse and is ergonomically designed to be used by either right- or left-handers. You can also see the optical sensor

work through the translucent bottom—it illuminates as soon as the mouse becomes active.

None of the optical mice we reviewed will work on glass or mirrored surfaces where the optical sensor will see its reflection. (Any very smooth surface can sometimes prove to be a problem with optical mice.) The precision of the optical Pro, however, is less likely than a conventional mouse to be hampered when used without a mouse pad or over a stack of papers.

The Optical Pro came with a USB-to-PS/2 converter (many of the other offerings also supported both USB and PS/2). The Kensington MouseWorks software provided was a piece of cake to install. Once we installed the software we were able to create pop-up menus to streamline everyday tasks and to keep frequently used commands at our fingertips. You can use the software to adjust the cursor's movement speed as well as to enable AutoScroll.

The Optical Pro is very smooth in operation. Each of the buttons had a nice feel and featured good travel.

Overall the Optical Pro is very precise, comfortable to use, works with both Macs and PCs, and is relatively inexpensive.

Kensington TurboBall

Price: \$89.95. ACCO Australia. Ph: 02 9700 0180; www.kensington.com

The TurboBall was the second Kensington pointing device that we reviewed. The TurboBall uses a large trackball, which is



EDITORS' CHOICE

- **Mouse: Microsoft IntelliMouse Explorer**
- **Trackball: Logitech Cordless Trackman FX**

The Microsoft IntelliMouse at only \$79 wins our overall Editors' Choice Award. Of those we looked at, the IntelliMouse was the most comfortable mouse-type pointing device to use. Having a slightly higher than normal centre made the IntelliMouse comfortable for the hand. It offers excellent precision, four buttons, and the ability to assign your most frequently used commands to any of the programmable buttons.

Out of the trackball pointers, the Logitech Cordless Trackman FX came out the clear winner. It offers the most flexibility and the best feel. It's priced a little more than the other trackball devices, but it is well worth the extra cost.

located on top of the device. It also features four buttons and a scroll wheel. Using the TurboBall keeps your hand and wrist in a neutral position. The benefit of this is that it reduces stress on areas of the hand and wrist and it helps you work more comfortably.

There are two buttons located on each side of the device. This design is suitable for both left- and right-handed users and is quite comfortable for all hand sizes. For right handers, the thumb operates the two left-hand buttons and the index finger is used to operate the trackball. The third and fourth fingers sit on the two side buttons.

The four buttons are oversized for easy operability. They are very curvy in shape and very easy to get used to. One of the reasons for them being oversized is to allow you to

v a r y your hand position to reduce fatigue. Like the Kensington Optical Pro, the TurboBall uses software to enable the user to customise the function of the buttons. You can set them up to open applications, or to paste in a block of text (like your name and address) into any document.

The trackball itself was slightly smaller than the ball used in the cordless Logitech mouse. It moves very freely and smoothly and facilitates precise cursor control. The scroll wheel, however, is

positioned in a slightly awkward position. You have to slide down your fingers from the natural position to control the scroll wheel.

Logitech Cordless Trackman FX

Price: \$139. Logitech Australia. Ph: 02 9972 3711; www.logitech.com

The Trackman FX was the only cordless

mouse that we received for this review. To install the Trackman you plug the cordless mouse receiver into the PS/2 port or USB port of your PC or notebook. The Trackman also takes one single AA battery.

The Trackman has a silver exterior and an adjustable wrist pad, which clips onto the end of the mouse. This pad allows you to customise the mouse to fit your hand size. The Trackman uses one-click scrolling and zooming. The pre-assigned scroll button sits between your thumb and index finger. You can also customise one of the four buttons for easy one click scrolling.

The Trackman uses optical technology to deliver smooth tracking and precision pointing. The trackball is fairly large and can be used with your thumb or index and third finger. There is a window, which lets you

move the trackball from one side to the other. The window is small, which makes it a little difficult to move the trackball with only your thumb. The Trackman can work anywhere within a two-metre range of the com-

puter.

The Trackman uses digital radio technology, which means it won't matter if you've got books or coffee cups sitting in front of the receiver.

This mouse gives you true freedom of movement. You can say goodbye to tangled cords, which also clutter your desk-space. And, it's relatively inexpensive at only \$139. It's made of very high-quality parts and, above all, it's very comfortable to use.



Kensington TurboBall

KENNINGTON
TurboBall

**Logitech
Cordless
Trackman FX**

Logitech iFeel MouseMan

Logitech iFeel MouseMan

Price: \$139. Logitech Australia. Ph: 02 9972 3711; www.logitech.com

The iFeel MouseMan has the vibrating "feel" feature of the iFeel Mouse. It gives you gentle vibrations as you move over Web links, pull down menus, icons and dialog boxes. The MouseMan, however, is styled very differently to the iFeel Mouse. It sports three conventional buttons and a scroll wheel, which can also be used as a button. The left and right buttons are fairly large and offer good

feedback. The thumb button is small

but is strongly constructed. The MouseMan is beautifully sculptured—it is very curvy and has a high arch where your index finger rests. It was among one of the most comfortable mice that we used (along with the Microsoft IntelliMouse).

The MouseMan has a clear base so you can see the insides of the mouse. Even the Logitech logo glows blue when the MouseMan is active. The MouseMan only ships with a USB connector. Many of the other mice also shipped with a USB to PS/2 converter. The software supplied allows you to assign commands such as cut

and paste and you can even assign function keys to any of the buttons. You can also adjust the strength of the vibrations and the speed of the cursor. The MouseMan also uses optical technology and costs \$139. It's one of the more expensive mice in this review but also one of the most pleasurable to use.

Logitech Wheel Mouse/Logitech iFeel Mouse

Price: \$70 (Wheel Mouse), \$99 (iFeel Mouse). Logitech Australia. Ph: 02 9972 3711; www.logitech.com

These two Logitech mice look the same but they don't feel the same. With the Logitech iFeel mouse you can actually "feel" the feedback when moving it. The mouse vibrates as soon as you move over icons, buttons, or links.

The iFeel mouse is the first of its type—a mouse that lets you "feel" the Web and your desktop. You can increase the sensitivity but the most the iFeel mouse will do is give you a mild tactile sensation (if the sensations get on your nerves you can actually turn it off completely).

Both the Wheel Mouse and iFeel Mouse have two programmable buttons and each has a scroll wheel (the scroll wheels can also be used as a third button). The software supplied is easy to use and will let you assign your most frequently used commands to your mouse buttons.

The Wheel Mouse is navy blue and the iFeel is light blue. Both use optical sensor technology and are precise and smooth in operation. When the mice are active you can see the red sensor shine through the translucent sides and base.

They are both pretty small mice compared to the other mice in this review. Users with big hands might find them a little uncomfortable. Both mice are symmetrical in shape and

would be suitable for both right- or left-handed users.

Both mice are strong and are built to last. The buttons feel good and solid.

Microsoft IntelliMouse Explorer

Price: \$79. Microsoft Australia. Ph: 13 20 58; www.microsoft.com.au

The Microsoft IntelliMouse Explorer we received is only suitable for right-handers. Left-handers would find this mouse quite uncomfortable to use. There are two buttons on the left-hand side where your thumb would rest and there are two buttons on the top as well as a scroll wheel that sits in between the two top buttons. The IntelliMouse has a metallic finish and a grey exterior. The base has a translucent red cover, which shows the insides of the mouse.

The IntelliMouse looks and feels great. The centre of the mouse is sculptured slightly higher than many of the other offerings, but this still feels very natural and comfortable. We found that the IntelliMouse offered excellent control. The hand sits nice and snug around the casing and, even though the top buttons don't reach out to the end of the mouse, you will still find the buttons easy to use. Because of the elevated centre, your fingers

will not reach over to the end of the mouse. The IntelliMouse has a little red window on the bottom of the mouse that lights up when the mouse is plugged in and active.

The software that shipped with the IntelliMouse is very similar to the software that was shipped with the WheelMouse. It lets you program both left and right buttons as you could with all of the other mice. You can pro-

Logitech iFeel Mouse

Logitech Wheel Mouse



Microsoft IntelliMouse Explorer

gram the two thumb buttons to act as forward and back buttons in your browser. Overall, the IntelliMouse is an excellent mouse and, for only \$79, it's an excellent buy.

Microsoft Trackball Optical

Price: \$89. Microsoft Australia. Ph: 13 20 58; www.microsoft.com.au

The Microsoft Trackball was one of the three-trackball devices we received. The casing was all grey and used a red and black trackball. All the trackballs we received were positioned in different places (the Microsoft Trackball was positioned on the left-hand side). You have to use

your thumb to navigate the cursor. We found that, with this configuration, we weren't as accurate or as fast in navigating

Microsoft Trackball Optical

boBall.

With the other trackball offerings you are made to use your index and third finger to navigate the cursor. It's much easier to use these fingers than it is to use your thumb.

As soon as you move the trackball the ball socket in which the trackball sits is illuminated and turns off once you take your thumb off the trackball. There are four buttons that run across the top of the device. With the way they are

positioned you could easily be pressing the wrong button if you weren't looking down at the mouse—the buttons are that close to each other.

The Microsoft Trackball is fairly long and it provides good wrist support. It is also sculptured high in the middle, which gives you a good grip over the whole device. The scroll wheel is nicely positioned for easy access with the middle finger. The software is again similar to the other Microsoft Intelli Software that we had seen with the other Microsoft mice.

Microsoft WheelMouse Optical

Price: \$59. Microsoft Australia. Ph: 13 20 58; www.microsoft.com.au

The Microsoft WheelMouse Optical is a no-frills optical mouse. It looks a lot like a conventional mouse but it uses an optical sensor instead of a mouse ball. It has two standard buttons, which reach out to the edges of the mouse. It also features a scroll wheel, which is located between the two buttons.

The WheelMouse is precise in operation and glides across a desk space smoothly. It feels quite light

and is very comfortable to use. The WheelMouse has some great curves along the sides that mould around your thumb and fourth finger.

Once we installed the mouse software we were able to assign commands such as tab, backspace, and find to the left/right buttons as well as the wheel button. There are also many other commands that we won't mention here because there are so many. The software also lets you adjust the scrolling on the mouse wheel—you can program the wheel to scroll one screen at a time or scroll a defined number of lines. There is also an array of pointers you can choose from and you can even adjust the pointer speed.

The WheelMouse is priced at only \$59, and though it's a lot more

Microsoft WheelMouse Optical



solid than the A4 Tech 2-wheel mouse, it doesn't have as many features as the A4.

Saitek GM2 Action Pad and Game Mouse

Price: \$80.34. Innovision Technology. Ph: 03 5831 8833; www.innovision.com.au

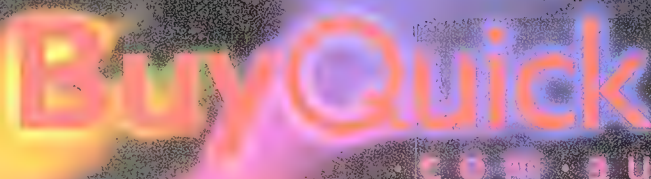
The Saitek GM2 Action Pad and Game Mouse is a new innovative games controller from Saitek, especially designed for gamers. The GM2 combines a mouse, which features a rotary scroll wheel, three buttons, and a four-way hat switch. The mouse does not use an optical sensor but a mouse ball. The mouse plugs directly into the back of the Action Pad using a simple telephone connector. The Action Pad then connects to your PC or Notebook via the USB port.

The Action Pad comprises of six buttons, an eight-way switch, throttle wheel (with

the cursor. The Microsoft trackball was also harder to operate than the Logitech Trackball and Kensington Tur-

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The Tablet Method

If you want professional-like drawing capability without having to buy a pricey, full-blown graphics tablet, then look no further than the Wacom Graphire (\$220).

Despite a few minor quirks, the Graphire's extensive functionality and affordability make it one of the best business and family graphics tablets on the market.

The Graphire is a handsome 1 x 20.5 x 21.5cm (HWD) tablet with a 10 x 12.5cm (HW) active drawing area and can be installed on any USB-equipped Mac or PC. (A serial model is available for older PCs.) The system consists of a mouse, a pen, and a tablet and is powered directly by its USB connection.

The wireless, ball-less mouse is designed to be used ambidextrously and has two buttons and a scroll wheel. It has a high resolution of 1015 lpi for quick manoeuvring around the tablet and can be set for relative or absolute positioning.

We found it interesting that Wacom's driver gives the Apple Mac a right-click capability in most applications and automatic scrolling on the Internet.

The Graphire pen is ergonomically shaped, with an eraser tip and a programmable double-sided switch on the side. Its 512 levels of pressure sensitivity give the pen a natural drawing capability.

Installing the tablet on a

Mac took just over a minute, but the procedure was more complicated on the PC. Unlike most Wacom tablets, the Graphire cannot coexist with another attached tablet, though it does work with a second PS/2 or USB mouse. If you have any brand tablet already active, it must be removed completely prior to installation. To complete the installation, the user must swap the Wacom CD for a Microsoft Windows 98 CD. Drawing is smooth and seamless, and its contoured shape is comfortable to the touch.

The toolbar is tiny and requires familiarising yourself with nonstandard icons, but drawing and annotating is as easy as using a pen or marker. Marking text with a wide highlighting felt-tip tool was imprecise.

The Graphire comes bundled with MetaCreations' Painter Classic, ParaGraph's PenOffice 2000, Sensiva, and ActiveShare for Windows.

With a pen, a mouse, and an excellent software bundle included, the Wacom Graphire is a bargain indeed. Better yet, the device works as well as much more expensive graphics tablets.

Wacom Graphire. Price \$220.

Requires: for Windows 98, 16MB RAM, free USB port; for Macintosh, MacOS 8.0 for PowerMac, MacOS 8.5 for iMac. Bits. Ph: 03 9696 1911; www.bits.com.au



self centring or freewheel options), shift button, and a programmable button that lets you assign up to 40 commands. This makes it an excellent controller for someone who loves to play strategy games.

Saitek Gaming Extensions (SGE) is the software Saitek supplies

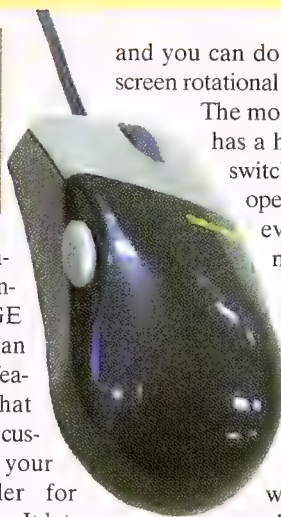
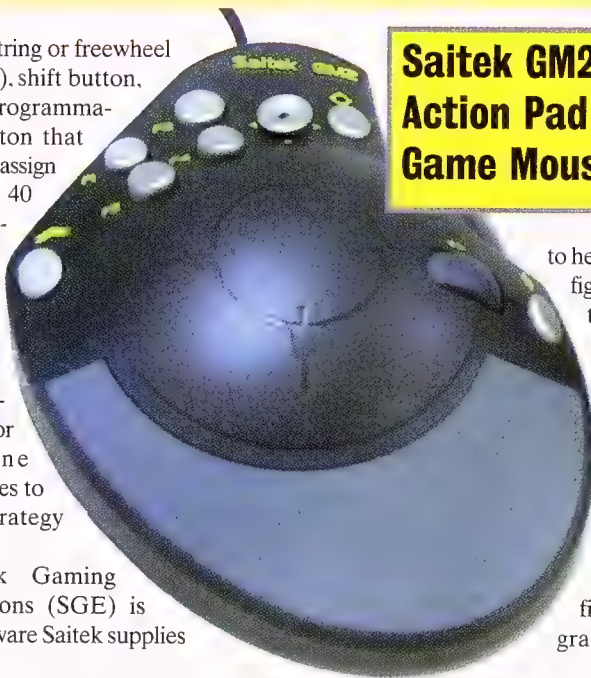
Saitek GM2 Action Pad and Game Mouse

to help you configure the controller. SGE delivers an array of features that lets you customise your controller for gameplay. It lets you create single and multiple profiles for games; program special moves

and you can do all this through an on-screen rotational 3D interface.

The mouse feels quite good—it has a high arch where the hat switch is that makes it easy to operate. It must be said, however, that the mouse does not move as smoothly as the optical devices (and don't forget: that tracking ball will need to be cleaned from time to time). At \$80, the GM2 is relatively inexpensive.

Most controllers fetch well over \$100 and have nowhere near the flexibility of the GM2. For the money, the GM2 does a good job and it offers gamers a well-balanced device without limiting the full potential of the game or gamer. **PC**



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From the capital of Tugo to a Hang Seng IPO, it's on the Web—if you can only find it. We review 30 search engines that make the hunt easier.

IN SEARCH

By Nancy Sirapyan
and Olga Jevdic



Looking for the actor who played Pentangeli in *Godfather II*? Rainfall patterns in the Amazon? The e-mail address of the high-school sweetheart you've lost touch with? All of that is on the Web—buried among two billion indexable pages.

Two billion is an impressive number, but even more impressive is that no matter how obscure a fact you're looking for, it's usually not that hard to find.

That's where search engines come in. The better ones have been diligent about keeping up with the explosion of Web pages, "crawling" them via agents. These tools examine and index pages' content, or, when the entire page cannot be processed, the metadata hidden in the sites' HTML tags. Google boasts the largest database, with 560 million fully indexed and 500 million partially indexed pages. AltaVista, FAST Search, and Northern Light each claim over 300 million.

Size isn't everything, however. Many factors contribute to a search engine's usefulness, from the algorithms it uses to process the information its crawlers dig up to its interface.

For this article, we put 30 general-purpose search sites through their paces, checking how well they responded to a wide range of search phrases, including "open-source software", "Buffy the Vampire Slayer", "what does WAP stand for?" and "trade relations with China".

No matter what we searched for or where, one thing was clear: search sites need to standardise query syntax. Though most of the sites we tested let you do phrase searches and use plus or minus signs to include or exclude terms, there are varying degrees of support for advanced features such as Boolean queries (the ability to specify and, not, and or), nested Boolean queries

(the ability to search for tennis and [Rafter or Hewitt], where all the answers will include tennis and at least one top Aussie player), domain queries (answers must come from dot-org sites, for example), and wildcards. A suggestion: if you use a site regularly, spend a few minutes reading the advanced search tips.

Search engines are statistical systems. They return exact and partial matches based on a document's probable relevance as calculated by the engine's search algorithm. Though Web directories such as the Open Directory Project or Yahoo! tend to do better with broad-topic searches such as online mortgages, search engines—particularly those with large databases—they respond better to specific searches. This is because the directories are hierarchical lists that categorise the Web like a library's card catalogue. They work well for the big picture, but the farther down you drill, the less likely they are to have indexed the page you need.

Another relevance test we examined is a site's ability to target the specific home page of a site. If you type in: Ford and car you'd want www.ford.com to show up on the first page, certainly before a site where someone is selling his own used Falcon.

Unless you have a unique search term, use as many words as possible to describe your query. For instance, a search for Carnivore brings up everything from the video game *Carnivores 2* to an open-air specialty-meat restaurant in Nairobi. Adding FBI to a query helps narrow results to the controversial e-mail surveillance system of the same name. One of the most effective ways of improving search results is to put quotation marks around words that should be searched as a phrase.

Specialised search engines and metasearch engines can be useful for narrowing your focus or casting your net wider. Specialised engines concentrate on more specific data sets, such as corporate information. Metasearch engines send your query to multiple search engines and collate the results. See the sidebar "Metasearch and Specialised Search" for more.

Once you get the drill down, search engines can be amazingly discerning tools for sorting the gold from the pyrite on the Web—and if you don't know what pyrite is, try typing +gold +pyrite into the engine of your choice.

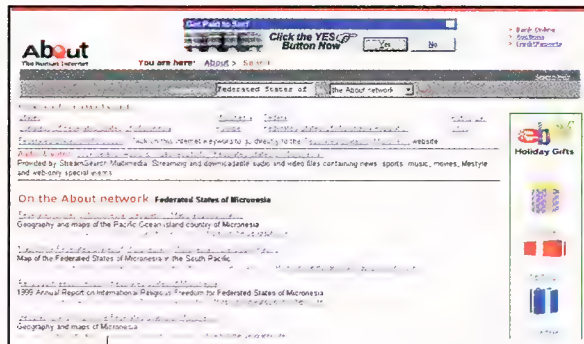


About

www.about.com ●●●●●

About returns three sets of results per query. One set of matches from the About directory, one from the Web at large (provided by Inktomi and Sprinks), and one from About partner sites. Although the di-

searches, such as Carnivore, looking for the FBI e-mail surveillance tool or natural-language searches, the engine fails. About also has problems finding specific home pages. These weaknesses are disappointing, but the site's excellent directory makes bookmarking it worthwhile all the same.



About's excellent directory makes bookmarking it worthwhile, as it returns good results for broad searches.

rectory, which incorporates original editorial content, is the site's strength, its limited search language makes it an indirect means of searching the Web that is most effective for general queries. For more complex searches, try another engine.

With About, for example, you can't use wildcards or ampersands, nor can you limit searches to a particular domain or personalise the search interface.

If your search involves a general subject or a relatively major organisation—the "Federated States of Micronesia", for instance—you get a good selection of relevant sites, particularly if you use the About directory. But with more specific

queries, including field searching and full Boolean support. The power search page lets you create complex searches either manually or using radio buttons and drop-down lists. AltaVista also offers the Babelfish document-translation service.

One of AltaVista's weaknesses is database freshness. During our testing, we often found hits that were no longer



AltaVista Australia features a host of advanced search capabilities.

AltaVista

www.altavista.com ●●●●●

AltaVista's strength is its advanced search capabilities: for sheer power and flexibility, you can't beat it. Unfortunately, AltaVista's content isn't fresh enough to make it a first-choice search engine.

AltaVista offers ex-

tensive advanced query op-

tions, including field

searching and full

Boolean support. The

power search page lets

you create complex

searches either manually

or using radio buttons and

drop-down lists. AltaVista

also offers the Babelfish

document-translation service.

One of AltaVista's

weaknesses is database

freshness. During our

testing, we often found

hits that were no longer

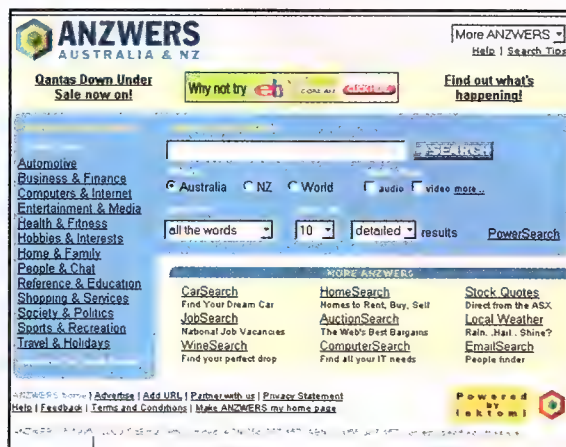
relevant, because the page had changed since it was crawled. AltaVista generally does better on specific searches, though it can't quite match the relevance of some of the other engines tested, such as Northern Light. Fortunately, the result page often has useful extras that can boost the quality of the results, such as related searches and recommended sites from the LookSmart directory. If you're looking for information on broad topics,

AltaVista AU

www.altavista.com.au ●●●●●

AltaVista Australia retains many of the advanced search capabilities of its US parent. The Text Only search is there, and the many query options make it easy to come up with excellent results on very specific searches. Even the Babelfish translation service is included.

But while the US AltaVista offers special pages for services like comparison shopping, the Australian site concentrates more on personalisation features such as MySearch, which lets the user



Anzwers is one of the most up-to-date search engines in terms of database freshness.

save favourite search queries and results. AltaVista Australia also offers separate pages designed to facilitate searches for a variety of media formats, including images, audio/MP3s, and video clips. In our local search tests, AltaVista did well, generating a large number of results for both simple and complex queries.

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Anzwers AU

www.anzwers.com.au ●●●●●

The Anzwers search engine has a wide range of search options, and a number of different search types available. It also features a category directory, powered by LookSmart.

Anzwers allows you to conduct a more focused search through the use of drop-

METASEARCH AND SPECIALISED SEARCH

According to a study last year by the NEC Research Institute, search engines not only cover just a fraction of the indexable Web, but their coverage also provides a low amount of overlap. That's where metasearch engines come in. By running your query on several search engines simultaneously, these tools can provide a much broader range of information more quickly. The best ones add value by combining hits, weeding out the duplicates, and ranking results by relevance, rather than just giving you lists of hits from each search engine. A good metasearch engine also shows which engines are being queried and make it easy for you to change the lineup.

Power searchers should remember that these tools may have trouble translating complex searches into the syntax of each engine. If you want to go beyond simple keyword searches, stick with common syntaxes, enclosing the terms searched in quotes or using plus and minus signs to include and exclude keywords.

In contrast to metasearch engines' broadcast-style searching, specialised search services zero in on relevant information by crawling only subject-specific Web sites. For example, if you are looking for documents related to a company's corporate earnings and don't want to spend hours sifting through ads for its products, you'd go to a site specialised in the subject, such as CorporateInformation.com. Also referred to as vertical or industry-specific search engines, specialised search services are becoming increasingly important.

METASEARCH

Despite the silly name, Infozoid (www.infozoid.com) is a serious contender among metasearch engines. Fast and flexible, it does well with complex queries, automatically forwarding advanced syntax such as Boolean operators and wildcards to the engines that support them. Our only gripe: it doesn't search Northern Light, one of the highest scorers in our search engine roundup.

Dataware Query Server (queryserver.dataware.com/general.htm) is another good choice. It covers all the major search engines and lets you choose which to query. Like Infozoid, it translates complex queries into the appropriate syntax for each engine.

Dataware lets you sort results by relevance, subject content, or site. Though it's one of the oldest metasearch engines MetaCrawler (www.metacrawler.com) remains a strong player. It covers most major search engines and offers an impressive selection of query customisation options, though you'll need to go to the power-search page to use them. We like the way it handles results, giving you the

option to sort by relevance, site, or search engine. It even suggests related searches.

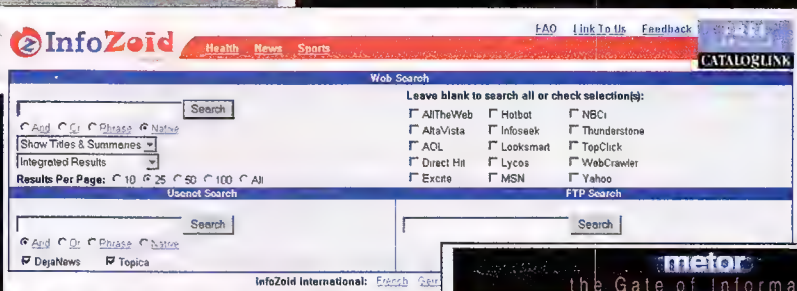
Metor (www.meteor.com) is also worth a look. Unlike MetaCrawler, it lets you to customise queries and choose which engines to search right from the main screen. Metor also offers a large collection of specialised searches, including technology, business, and news.

SPECIALISED SEARCH

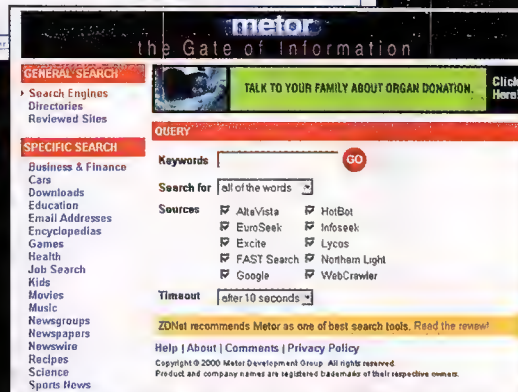
A good place to start with these more focused engines is Danny Sullivan's Search Engine Watch (www.searchenginewatch.com/links/Specialty_Search_Engines), which gives you a list of specialised engines. We found ourselves regularly heading to several specialised engines. EoExchange has developed three specialised search engines focused on e-business and technology topics: the B2B Research Center (www.eoenabled.com/b2b), the Business & Technology Research Center (www.eoenabled.com/bandt), and the IT Professional Research Center (www.eoenabled.com/itpro). For company or stock information, try CorporateInformation.com, justquotes.com or TradingDay.com.

Government Web sites can be a rich informational resource: the recently unveiled FirstGov (www.firstgov.gov) is the US government's search engine for its vast network of sites.

It's important to remember that search engines can't reach much of the information on the Internet. Often referred to as "the invisible Web", this information is hidden in Web databases that search engine crawlers don't index. Much of the invisible Web consists of topic-specific databases with specialised content, such as technical papers, company information, census data, government documents, reference works, library catalogues, and more. Low on glitz and high on content, Direct Search (<http://gwis2.circ.gwu.edu/~gprice/direct.htm>) is



one of the best resources for finding Web databases. Other useful sites are Lycos' Directory of Searchable Databases (http://dir.lycos.com/Reference/Searchable_Databases) and WebData.com. —NS

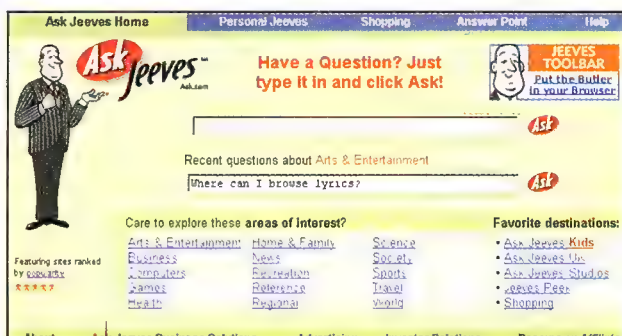




The AOL Australia search engine may be simple, but it offers the same advanced search tools as the US site.

down menus on the home page. And there are other search categories such as CarSearch, AuctionSearch, and ComputerSearch. The options for regular searches are numerous, including domain, date, media type, filters, Boolean search, and metaword search. The media type list is exhaustive, listing not only images and audio, but also Java, Shockwave, ActiveX, and Acrobat files—you can even enter a file extension to be searched for.

In our local search tests, Answers yielded good results, with only a few duplicate links included. We were pretty impressed when we didn't receive a single broken link in the top 20 results for four different searches. The results were displayed with URLs and date last updated, as well as relevance ratings in the form of percentages. Another helpful feature was a box that appears on every results page, presenting a number of news articles related to the search topic.



Ask Jeeves is a search engine specifically targeted at answering natural-language requests.

The results yielded from an Answers search were not the best we saw, but they were certainly right up there. Answers simply cannot be overlooked—it is one of the most up-to-date search engines in terms of database freshness.

AOL.com

www.aol.com ●●●●●

It's not the tools that count but how you use them. And though the AOL.com search engine may provide a full toolbox with dozens of ways to refine queries sharply and without expert insight, it yields very poor results. Unless you can afford to take considerable time with each

between strings with or without the "!" operator. At any rate, the page describing how to use these terms is buried deep within the site.

AOL.com's most serious weakness appears when entering a few keywords or a natural-language search. For our search on Euro and our natural-language question "What does WAP stand for?", not one of the top ten results was relevant.

AOL.com (AU)

www.aol.com.au (then click on "Search") ●●●●●

The Australian AOL search engine is very simple, with a number of options offered in the advanced search area. The search engine itself can only be accessed by going to the AOL Australia home page, then clicking on the search link. A variety of LookSmart categories are provided for browsing, but these are limited.

The same toolbox the US site offers for fine-tuning a query is provided on the local site.

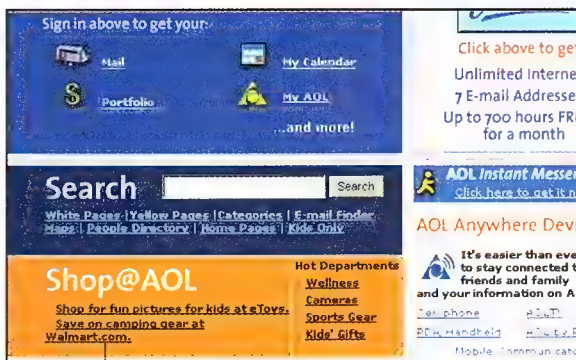
AOL Australia's most serious weakness appears to be the quality of its results. For our natural-language question "What does WAP stand for?", a few of the top ten results were relevant (slightly bettering the performance of the US site), but many were duplicate links—one site was listed four times in the top ten. Our keyword and general searches yielded good results but again, duplicate links were common. Using search operators made no noticeable difference in the results generated.

Unless you can afford to take considerable time with each query, you'd probably be better off searching with another local engine.

Ask Jeeves

www.askjeeves.com ●●●●●

Jeeves, P.G. Wodehouse's indispensable butler, performs every task asked of him, perfectly and without question. Ask Jeeves, the natural-language search en-



The AOL US search engine offers a full toolbox with dozens of ways to refine queries.

query, you're better off searching elsewhere. Quick or casual keyword searches are likely to end in frustration.

For defining search terms, there are myriad options. Using the ADJ operator, you can search for keywords adjacent to each other. With the W/N operator, you can search for keywords within a certain distance of each other. With the "!" concept operator, you are supposed to be able to search for sites that deal with a keyword but may or may not actually contain it. Unfortunately, our tests found no difference



MORE ON THE WEB: For more on search engines, check out our links at www.pcmagazine.com.au





Direct hit rates Web sites by popularity, and therefore excels at targeting home pages.

gine, would do better to ask for clarification, however, since it often fails to understand requests. Since Ask Jeeves's main strength is meant to be natural-language requests—queries typed in plain English—this is a serious shortcoming.

Jeeves performs best when given shopping and business queries. It did poorly with simple keyword searches and offers no way to perform more advanced searches or to drill down for answers. Given a natural-language query, Jeeves comes back with a short list of similar questions for you to ask instead of your original question. The service has answers to its own questions, but its list of questions often misses the point. Ask what region in France a particular wine comes from, and Jeeves will tell you where you can buy wine online and where to find tips on travel in France.

Your best bet for almost any type of search is to head straight for the second bank of answers on the page: "People with similar questions have found these

sites relevant." These links are Direct-Hit-rated and tend to be dead-on.

Direct Hit
www.directhit.com

Even if you have never searched with Direct Hit, you have seen results from the service if you've used its partner sites, such as Go2Network, HotBot, Lycos, or MSN. Direct Hit excels at home page targeting. This is because it rates Web sites by popularity, on the assumption that the most popular sites are the most useful. Results come with ranking icons of one to five little orange men, depending on how many people visit the site and how long they stay. Direct Hit also provides related searches to help you refine your search.

Recently acquired by Ask Jeeves, Direct Hit lets you search Jeeves's answers in addition to its own Web, shopping, and category searches. You can limit searches by text, location, region, and domain with the advanced search option. You can also personalise results by entering your birth year, and gender—a feature that aims to provide results targeted at your demographics.

The main problem encountered during testing was a surprising number of expired links and multiple results from the same site. But overall, Direct Hit gave relevant results in an easy-to-read display.

Excite.com

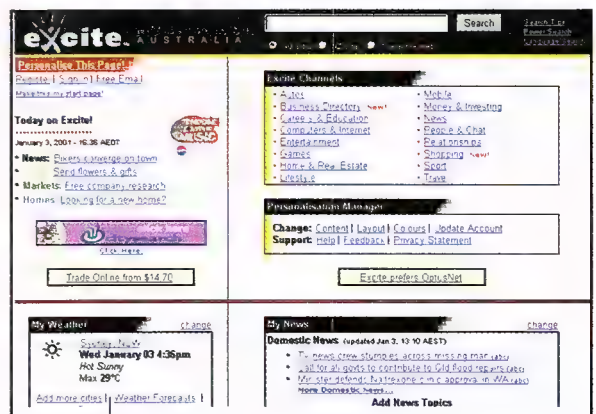
www.excite.com

Excite.com falls squarely in the middle of the search-engine pack. It's a perfectly adequate

search engine and Web directory, but it lacks the uncanny accuracy of Google and the power of Northern Light. With a Web database of 250 million pages, it's also quite a bit smaller than many of its competitors.

The engine performed respectably on our tests, particularly on more specific queries such as China +trade relations or Federated States of Micronesia. It also did well on queries targeting specific home pages, such as L.L. Bean's site, but it tends to have less success with broad queries.

Excite.com has some useful extras, such as a handy news search and specialised searches for photos and audio/video. A search for a publicly trad-



Excite Australia does well with specific queries, and includes a detailed search tips section.

ed company will bring up links to stock information and a company profile from Quicken.com.

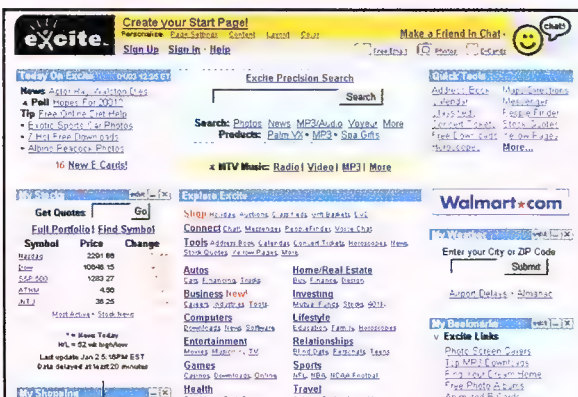
Excite.com supports Boolean operators such as and, or, and not, as well as radio buttons and drop down lists on its advanced search page, but power searchers may be frustrated by limited field-searching capabilities. Though Excite.com will let you search for pages within a domain, there is no way to limit your search to a Web site or to search for keywords within the URL or for a title of a document.

Excite Australia AU

www.excite.com.au

Like Excite.com, Excite Australia is a middle-of-the-range search engine, providing some good results and search options, as well as a category directory.

The engine performed well in our



Excite offers some useful extras in addition to its general search function, including a news search.



FAST search has a large database and plans to expand it even further by the end of the year.

tests, particularly on more specific queries such as "What does WAP stand for?". It also did well on queries targeting specific home pages, such as the official Buffy the Vampire Slayer site, and it tends to have success with broad queries. Unfortunately, like many other search engines, duplicate links were very common. We did, however, rarely encounter an expired link.

Excite's advanced search supports Boolean operators, though this information is not intuitively located. Advanced search information and information on many other topics can be found in the Search Tips. The information in the search tips addresses almost every aspect of the search and results—in the form of frequently asked questions with examples—and also covers things like the meaning of browser errors.

Although Excite is an adequate search

engine, the fact that there is no way to see how many pages of results there are—or the number of results in total—is a big disappointment.

FAST Search

www.alltheweb.com ●●●●●

No games, no calendars, no photo albums. Like Raging Search and Google, FAST Search does just one thing: search. Though FAST Search is aggressive about

increasing its database size (it plans to have a billion pages by the end of 2001), it needs to iron out a few wrinkles before becoming a serious player.

FAST Search did reasonably well

when we targeted a specific Web site, such as Linux Documentation Project. It also performed impressively on very focused queries such as deep blue +chess. Unfortunately, FAST Search has a tendency to bring up numerous pages from the same site, and unlike some of the other search engines in our roundup, it offers no way to group such results. Another of FAST Search's quirks is that it

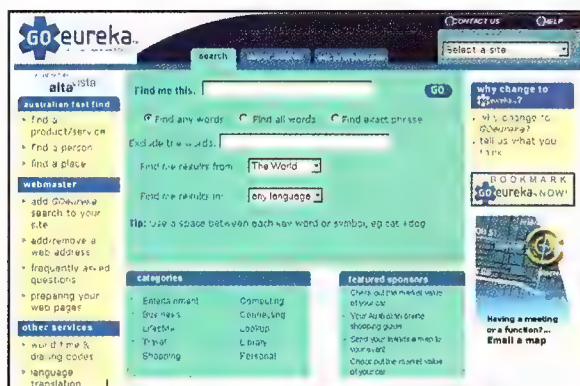
neither automatically stems word endings, nor supports wildcards. If you want a search to cover variations of a word, you must list each of them in your query. Looking for information on pricey mushrooms? You'll need to use a minus sign to specify truffles –(chocolate chocolates).

FAST Search does not support traditional Boolean syntax, but you can include or exclude keywords with plus or minus signs or by using the drop-down pick lists on the Advanced Search page. FAST Search also offers field searching, domain filtering, and language filtering.

GoEureka AU

www.goeureka.com.au ●●●●●

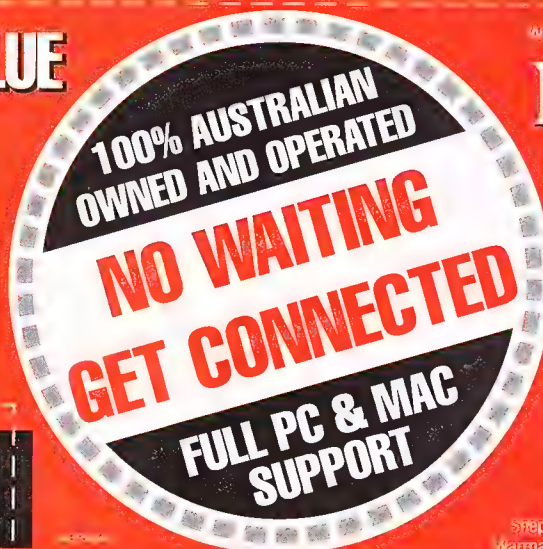
GoEureka is a well-organised search engine. Its associated sites include the Yellow and White pages, as well as the



GoEureka is a well-rounded search engine that allows you to set search preferences for repeated searches.

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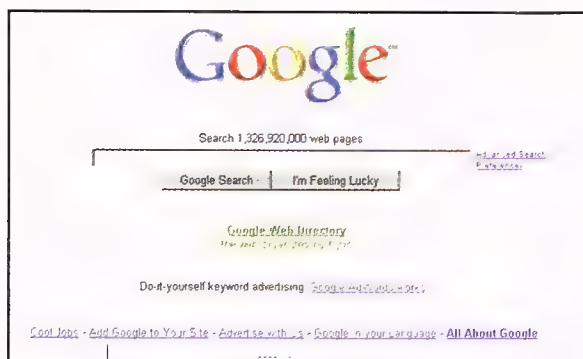
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Google's results are consistently high-quality, and it excels at targeting home pages.

much identical to the AltaVista results, but they were much better organised. GoEureka not only lists the site descriptions and URLs, but it also shows the date the site was last modified, along with the file size. This is a very well-rounded search engine.

Google

www.google.com ●●●●●

At a time when many search engines are expanding into portals, Google still focuses solely on searching. Fast and with a refreshingly spare interface, Google consistently turns up high-quality, highly relevant results. Google does well on specific queries, such as World War II Australian casualties, and broad-topic searches, such as home buying. It's also great at targeting a specific home page, having the best accuracy rate in this roundup.

Google recently started incorporating useful extras into its Results page. Depending on your query, you may get stock quotes, or related news stories for example. We like Google's ability to view cached copies of results pages. When the page you want

access is no longer live, you can view a cached copy of the way it looked the last time Google crawled it.

Google offers only basic query customisation features, including phrase searching and foreign-language filtering. You can use plus or minus signs to include or exclude keywords, or you can head to the Advanced Search page for drop-down pick lists to construct complex searches. Google doesn't support advanced features such as date filtering, wildcards, or proximity operators, yet the quality of the results match, or exceed, those of every other international site tested.

GoTo

www.goto.com ●●●●●

GoTo seems to run on a "power to the payer" motto. As with Direct Hit, sites can pay to have their links show up near the



GoTo is great at multi-word queries and complex searches.

Whereis street directory. It is powered by AltaVista.

There is a variety of search criteria to choose from on the home page, including the choice of "any words", "all words", "exact phrase", and "words to be excluded". You can also specify the language and domain to be searched. Even more options can be found on the Super Search page. Here you can specify where to search—keywords in a page, URL, or host—and from what date. Boolean searches are supported.

An excellent feature of GoEureka is the ability to set preferences. You can select the type of search you use most frequently, the domain, language, and result format, then set these to appear each time you visit the site. A detailed help section is provided, featuring search tips, a glossary of terms and frequently asked questions.

The results we received were pretty

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top of the returns list. And, when you enter a query, that price is advertised. The more you pay, the higher your placement. Not all our searches featured paid placement, however.

Though not adept at finding sites relevant to our simple keywords, GoTo excelled at multiword queries and complex multiword queries (which use plus or minus signs to require or exclude terms). GoTo fell flat at finding home pages, placing the home page within the first ten responses only 40 percent of the time during testing and not once placing it at the top of the list, even when no money changed hands.

HotBot

www.hotbot.com ●●●●●

For complex, carefully targeted Web searches, HotBot, owned by Lycos, is one of the more accommodating search engines. HotBot provides an impressive number of ways to specify what you seek and where to find it. When you're casually searching the entire Web for a keyword or phrase, however, it's not much more effective than the others in this roundup.

When you input a query, the site first displays a list of related queries, then a list from Open Directory, followed by a list from the Web. If you do a simple keyword, phrase, Boolean, or wildcard search, results from the Web are good but not extraordinary. During testing, HotBot handled the natural-language query "Who wrote *The Remains of the Day*?" quite well, but it didn't find www.linux-doc.org when we searched on Linux Documentation Project.

The engine's strengths lie with its advanced search and personalising options. On the versatile Advanced Search page, you can restrict the scope of your query, searching, say, only for pages that contain MP3 files or video clips. If you want to restrict all your searches, not just the current one, you can freeze these settings with the engine's Personalize feature.



HotBot is ideal for complex searches, and its versatile advanced search options allow you to personalise your search settings.

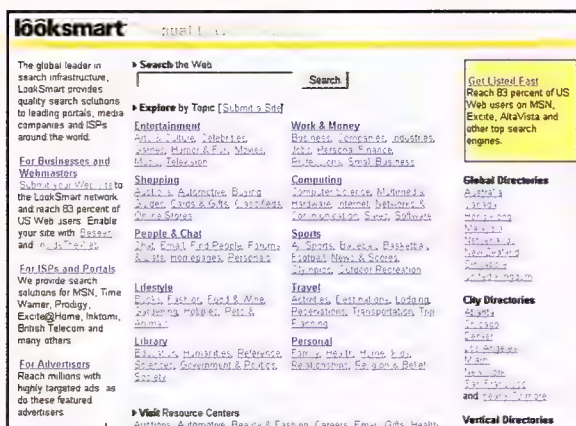
iWon

www.iwon.com ●●●●●

iWon's search engine may keep US users in the green (the site gives away US\$10,000 a day and US\$1,000,000 a month), but its search capacity may leave you seeing red, at least in terms of how much information you get. iWon returns relevant results inconsistently and is generally only average in effectiveness.

iWon uses a Web-text search engine from Inktomi, answers natural-language queries via Fact City (which specialises in fact and statistical queries), incorporates a directory from LookSmart, and supplies lists of the Web's most popular sites through Direct Hit. You can limit your search by site title, domain, or URL and use various Boolean, exact phrase, and wildcard operators.

Even so, query results are often egregiously irrelevant. For example, if you use



Looksmart has an extensive category directory and Looksmart Live!, which provides answers to natural-language queries via e-mail.

a minus sign to exclude a word, the engine isn't smart enough to ignore words similar to those you have excluded. When we searched on truffles—chocolate, iWon returned a site called "Truffles Chocolates". We were unimpressed with the natural-language engine, which is good at questions about films or music but speechless when we asked, "What does WAP stand for?" or "Who wrote *The Remains of the Day*?"

Because many of its features are so US-orientated, Australian users may find that this is not the site to bookmark.

LookSmart

www.looksmart.com ●●●●●

With a team of live Webrarians and directory of 200,000 categories, LookSmart might have been expected to score higher than it did. Unfortunately, a handful of weaknesses hurt this site's score.

Search results may include a directory category and ways to refine searches, followed by reviewed and relevant sites. But beware: you get links to LookSmart sponsors first, including faux results such as Use your NextCard to buy Federated States of Micronesia when you search for the country. Another annoyance is that URLs aren't displayed, which makes judging result relevance quickly difficult.

For the most part, LookSmart's results are on the mark, especially with multiword queries and travel-related searches. LookSmart's main weakness, however, is that, as with Lycos, there seems to be no

way to exclude terms from a search. Boolean operators don't work, and no advanced search option exists. One way to work around this is to explore LookSmart's directory by topic.

Although LookSmart is not equipped for natural-language queries, LookSmart Live! can help. Submit a question and you'll be notified via e-mail when another Live! user answers it. Of course, that eliminates the instant gratification most of us expect from the Web. The correct answer to the question "Who wrote *The Remains of the Day*?" was sent to us 16 hours after we submitted it—and then four more times over the next two days.

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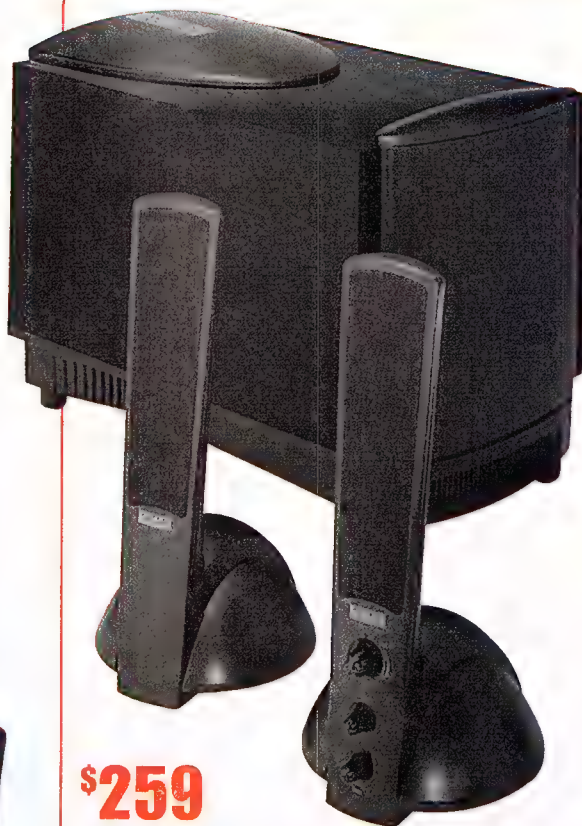
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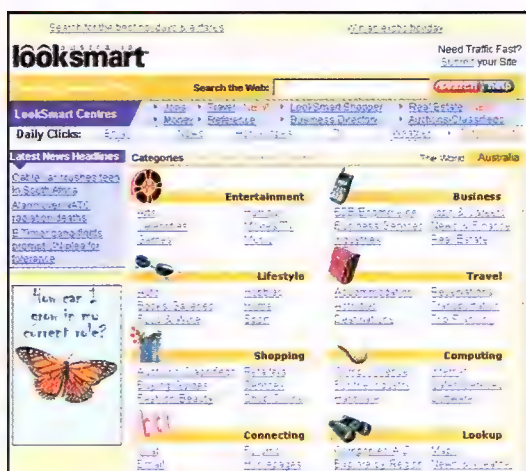
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Looksmart Australia's results are on the mark when it comes to multi-word queries and travel searches.

LookSmart AU

www.looksmart.com.au ●●● ●●●

The Australian LookSmart has a much different look and feel than the US site reviewed above. We found the local version to have a much friendlier and tighter layout. The one thing that was noticeably missing, however, was a simple method of specifying whether a search is worldwide or limited to Australian sites. Below the search window are two tabs labelled "Australia" and "The World", but switching between them requires the re-loading of the entire page—a step that could get quite annoying when doing several searches. Even with the "World" tab selected, a search for a generic word like "bicycle" yielded all Australian sites in the top ten.

Nor is there any apparent way to specify an advanced search. A bit of general search information can be found in the help section, but this is not very useful. Like on the US site, the Help section tells you that a category search actually means manually browsing the LookSmart categories for topics.

Search results are organised into three tiers: categories from LookSmart are listed first, followed by LookSmart site matches, then general site matches.

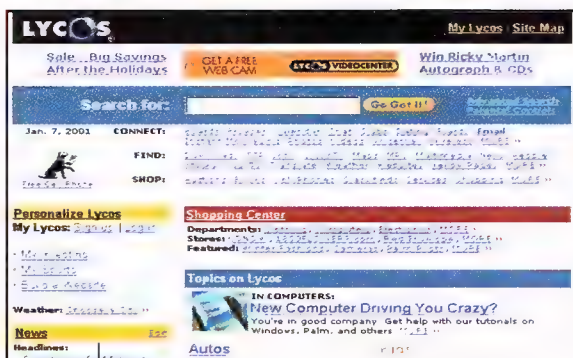
For the most part, LookSmart's results

are on the mark, especially with multi-word queries and travel-related searches. LookSmart's main weakness, however, is that there seems to be no way to exclude terms from a search. Boolean operators aren't supported, and no advanced search options exist.

Lycos

www.lycos.com ●●● ●●●

Lycos's main strength is its depth of search results, which include the four most popular Web sites, determined by user-selection traffic and listed before other Web hits. Results may also yield links to related searches, news articles, or shopping sites. Search for a company and



Lycos' strength is in the depth of its search results and the additional information they provide.

Lycos provides links to financial news, charts, and research; search for a music band and it will try to find you fan home pages, album reviews, and MP3 sites. A home page targeting search for Buffy the Vampire Slayer yielded links for multimedia, program guides, fan pages, and a Web directory of Buffy links.

Although its major strength may be all the additional links it provides, Lycos also did fairly well in our testing for relevant Web site results. The official Buffy home page, however, showed up fairly late in the regular Web page results.

Boolean searches and other complex multi-word queries work best. Don't bother using plus or minus signs, though. A search for truffles -chocolate served up quite a few chocolate-related results. Worse, lumped in with the popular results for online mortgages were two large ads for online casinos. Apparently what's popular isn't always what's relevant.

Matilda AU

www.aaa.com.au ●●● ●●●

Matilda is actually two search engines in one: Matilda is the international search engine, and Boomerang is the Australian version of Matilda. Unfortunately, the site's few good features aren't enough to allow you to overlook the many flaws of this search engine.

You can choose between Matilda or Boomerang as your primary search engine, depending the type of search you wish to conduct—global or Australian. However, this is not apparent until you scroll down to the category directory (similar to that in LookSmart) where the categories are divided into the two groups. Other specialised search engines can be used—Wipeout (a surfer's search engine), for example—though there is nothing to tell you this until you have completed a search.

Matilda has no advanced search options and doesn't even provide a help area—the only suggestion made is to "use more words for better results".

A helpful extra that is included is a location/post code search, where you can enter the suburb or post code and receive excellent results. Another good



Matilda features a category directory and enables you to conduct a search using one of their specialised search engines.

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feature is the status indicator that shows the progress of the results as they are loading.

The Matilda search returned a number of results, though the lack of URLs made it difficult to determine their relevance. The organisation of results was confusing, as they were grouped into categories, which were listed alphabetically.

The Boomerang search was anything but helpful. A search for Buffy the Vampire Slayer yielded no results, but we received 76 when we searched for

online mortgages. Again, the results were grouped into the Business and Economy category, and again, no URLs were listed. Upon closer examination, it was found that all 76 links led to the same site. We received only one result for mortgages, but received none for Buffy.

The Matilda search engine is confusing and messy. It provides a concise selection of categories for browsing, but if you're looking to do a search, you'd best do it at another site.

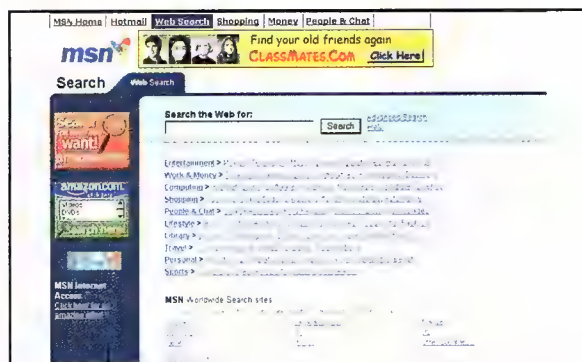
MSN

www.msn.com ●●●●●

The MSN engine performed well in testing—with one notable exception. It provides extensive ways to refine searches and generates, on the average, more relevant results than other popular engines. Unfortunately, its tool for excluding pages containing particular words is broken.

MSN's advanced search tools mirror those of HotBot's. You can perform wildcard and Boolean queries. The scope of each query is easily limited by restricting results to sites that, for instance, contain certain file types and reside within a particular domain. And unlike with HotBot, you can readily save your searches and return to them later.

One complaint: when you input a query, MSN first gives a list of featured sites from MSN or MSN sponsors. Spon-



MSN provides extensive ways to refine searches and allows you to save searches for later.

sors often pay to be included on this list, but it still typically includes relevant responses. Following the featured sites are lists of matches from the MSN Web directory and popular matches from the Web at large. The directory results are helpful for general searches, and the Web matches are unusually good as well. It is all the more disappointing that the engine's word-exclusion feature doesn't seem to work; a search for dead-grateful yields, as its first result, <http://grateful.dead.net>.

NBCi

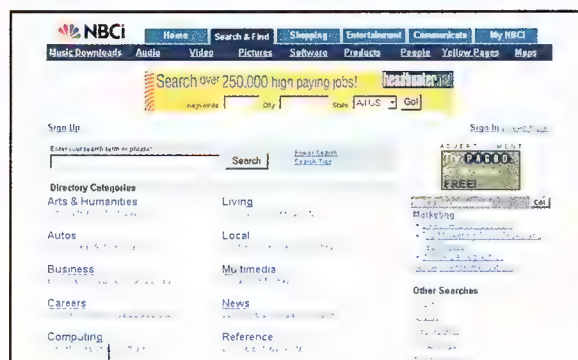
www.nbc.com ●●●●●

As with Yahoo!, NBCi (formerly Snap.com) first offers results for a typical search from NBCi's own directory ("Top Sites"). Additional ("Web") sites follow. Other categories are the Search Marketplace, which consists of featured listings from sponsors, and Member-Submitted sites.

Marketplace hits pop up mainly on the kinds of searches that trigger targeted banner ads: words like buy, mortgage, and golf bring up sponsor links at the top of the screen. We encountered no Member-Submitted sites.

NBCi's strongest results were in commerce, finance, and unusual phrases such as Federated States of Micronesia. Returns on technology queries, such as Linux Documentation Project and Palm Pilot were mixed. Home page targeting was strong: the Linux Documentation Project was the only one NBCi failed to find.

NBCi scored fairly



NBCi's strongest results are related to commerce and finance; home page targeting is also good.

THE AGENT APPROACH

BullsEye is a superb, ad-supported, desktop search agent that enables you to fully exploit untapped resources of the Internet. At its most basic level, it simultaneously sends your search words/phrases to several major search engines, weeds out duplicates, and ranks results according to relevance. You can also choose to validate and/or download the results to your computer. Select an entry in the resulting hit list to view the page in the built-in browser window. For a better look, send it to your default browser.

Beyond simple Web searches, BullsEye 2 provides 14 additional major search categories (organised into more than 120 total categories and 700 search engines), including News, Shopping, Computers, Books, Multimedia, and Health, and a special section for searching the expansive ZDNet Web site. You can generate search reports as HTML or send them out as e-mail. As you browse search results, you can mark each as read or unread and choose to include/exclude each from your report. You can also save and manage your searches, search country-specific Web sites, manage Web browser bookmarks, refine existing searches, add to and edit the extensive search engine list, and send individual links as e-mail. An even more powerful version is available for US\$149.

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well on finding home pages and on simple multi-word queries. Natural-language queries bombed, except when we asked a "Where can I buy...?" question. One of NBCi's best return sets was on the tricky one-word query for the recently released film "Quills". Answers included several movie databases, the official site, and sites related to Michael Caine and Geoffrey Rush, who appear in the movie.

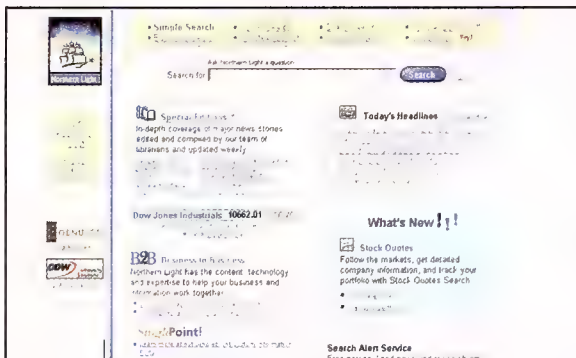
Northern Light

www.northernlight.com ●●●●●

Whether you need an answer to a highly specific query or to a general keyword search, Northern Light may be your best option. Using a unique custom-folders feature and natural-language engine, the site aced our tests, answering queries with numerous relevant results when some sites had trouble supplying one.

You can use wildcard and Boolean operators to define your search. Power Search tools help define where to look, allowing you to limit searches to URLs or company names, for example. Although not perfect, the engine did well on natural-language queries, too. When we asked, "What does WAP stand for?" (a question few search engines could answer), Northern Light supplied ten pages with the answer.

If you can't find relevant results at the



Northern Light aced the natural-language queries, and it offers a unique custom-folders feature that organises the results.

top of the general list of hits, don't worry. Northern Light also sorts the general list into subcategories, or custom folders. In a search for Carnivore, the FBI surveillance tool, the first page of the general list had few relevant results. But an FBI custom folder had also been created, offering only appropriate results.

Worth noting, too, is the company's generally for-pay special collection, which represents nearly 7000 sources not commonly found on the Web.

Oingo

www.oingo.com ●●●●●

Oingo's strength is its ability to zero in on what you're really looking for. Say you're looking for Java, the Indonesian island. Type in "Java" on most engines and you'll likely be at sea yourself. For most search terms, however, Oingo pro-

vides drop-down boxes (multiple boxes for multiple terms) to help clarify what you're looking for: including coffee, a programming language, or a breed of chicken.

Like NBCi and Yahoo!, Oingo has its own directory of Web pages, and when you search with Oingo, it returns a column of directory matches and a column of Web page matches provided by AltaVista. This display, although well intended, seems cluttered. You see the page title and summary, where available—but no URL. You get a

lightbulb icon when Oingo believes it has matched not just your search terms but the actual concept you're after.

Oingo handled our natural-language queries relatively well, missing only the "What does WAP stand for?" query. Simple and complex multiword queries returned very good results, and Oingo did not miss a single home page target.

Open Directory Project

www.dmoz.org ●●●●●

The Open Directory Project is an extremely successful Web directory. It's an organised listing of sites assembled by editors around the globe. It is not a search site, but its native search engine provides a respectable means of searching its excellent directory, which is also available on AltaVista, Google, HotBot, Northern Light, and Yahoo! Since Open

International Search Engine Evaluation

	Overall	Simple Search	Complex Search
About	●●●●●	●●●●●	●●●●●
AltaVista	●●●●●	●●●●●	●●●●●
AOL.com	●●●●●	●●●●●	●●●●●
Ask Jeeves	●●●●●	●●●●●	●●●●●
Direct Hit	●●●●●	●●●●●	●●●●●
Excite.com	●●●●●	●●●●●	●●●●●
FAST Search	●●●●●	●●●●●	●●●●●
Google	●●●●●	●●●●●	●●●●●
GoTo	●●●●●	●●●●●	●●●●●
HotBot	●●●●●	●●●●●	●●●●●
iWon	●●●●●	●●●●●	●●●●●
LookSmart	●●●●●	●●●●●	●●●●●
Lycos	●●●●●	●●●●●	●●●●●
MSN	●●●●●	●●●●●	●●●●●
NBCi	●●●●●	●●●●●	●●●●●
Northern Light	●●●●●	●●●●●	●●●●●
Oingo	●●●●●	●●●●●	●●●●●
Open Directory Project	●●●●●	●●●●●	●●●●●
Raging Search	●●●●●	●●●●●	●●●●●
Yahoo!	●●●●●	●●●●●	●●●●●

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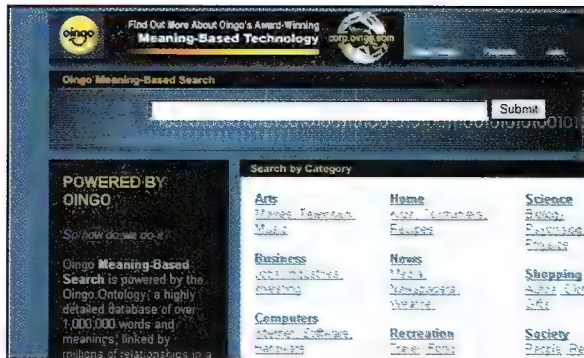
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Oingo zeroes in on what you're really looking for by providing drop-down boxes to clarify your search.

Directory searches are limited to the information in its own database, they may be incomplete.

You can use wildcards and Boolean operators to refine your search, as well as restrict it to major directory categories, but you can't indicate a preference for a specific date or file type. The engine has two types of results: directly accessible Web pages and browsable directory subcategories. Our search for Federated States of Micronesia, for instance, yielded "Regional: Oceania: Micronesia, Federated States of"—with each level being a live link. Open Directory also returned specific sites, such as "Embassy of the Federated States of Micronesia (Washington, DC)."

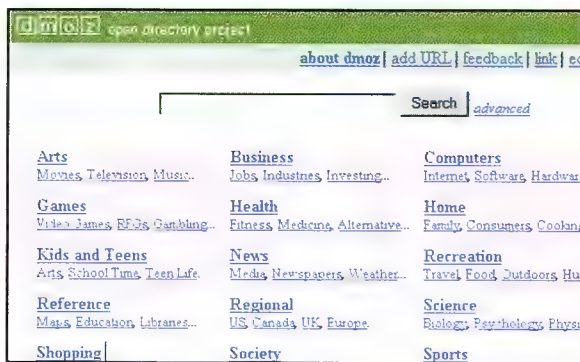
For such general searches, the results are typically accurate. Complex searches, however, are another matter. Natural-

language queries, such as "Where can I buy wine online?" mostly returned sites with the words "where" and "can"—but not "wine".

OzSearch AU

www.ozsearch.com.au

OzSearch was under scheduled maintenance at the time of testing, so we were unable to comment on all of the search engine's features and options.



The ODP is a Web directory comprised of a listing of sites assembled by editors around the globe.

language Web.

OzSearch should be used for basic single-keyword searches only. There were

some advanced search options, though these were buried deep within the help menu, after scrolling to the very bottom of the home page. Search operators like + and - are supported, although this made no difference to the results.

OzSearch suggests the use of quotation marks to search for phrases, but this narrowed the search so much that no results were generated when we searched for "online mortgages". When we did get results, we were annoyed to find that only some of the results had their URLs listed. Our natural-language query was even less successful, with only the most common words—"what" and "does"—yielding any results.

In the end, we found that even OzSearch's provision of search operators didn't seem to help the engine come up with many results.

Raging Search

www.raging.com

With its Raging Search, AltaVista has gone back to basics—no bells, no whistles, just unbridled power. Raging Search is for those who like the flexibility and advanced capabilities of AltaVista but don't need portal elements such as news feeds and shopping services.

Raging Search's strength is its advanced search capabilities. It supports field searching, Boolean queries, wildcards, and date searching. Options include adding field or date searching boxes to search pages, indicating how many hits to display per

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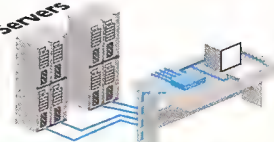
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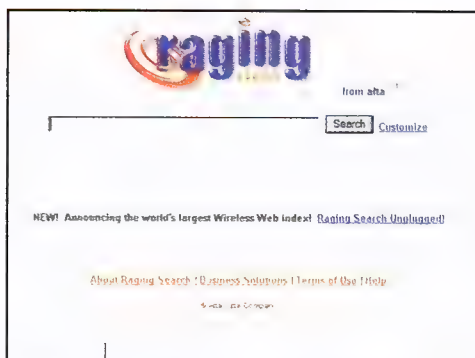
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Raging Search has excellent advanced search capabilities.

page, and specifying what information to display.

Raging Search uses the same index as AltaVista, but it delivers slightly different results. As with AltaVista, it tends to work better with very specific searches, such as deep blue +chess, (looking for information about IBM's chess supercomputer) than with more general queries. Raging Search also performed respectably when we targeted specific sites, such as International Telecommunications Union. Even with

very focused searches, however, Raging Search can be ragged. Unfortunately, it shares AltaVista's tendency to return irrelevant links where content has changed since the page was last crawled.

Web Wombat

www.webwombat.com.au 

Web Wombat's search engine—entitled Wombat Search 3.2—has a database of around 6.5 million Australian sites and 68.5 million global sites.

Also offered is a regional search in which you specify a domain, and a vertical search that is category specific.

The advanced search options offered were limited to selecting from any or all words, and any order or exact match. The results we received were surprisingly good for most

queries.

However, our natural-language request yielded poor results, with each word searched individually, rather than as a phrase.

Wombat Search results had their URLs listed, along with a percentage relevance rating for each site—something we feel should be included with all search engines—and these were, generally, right on the mark. Although they

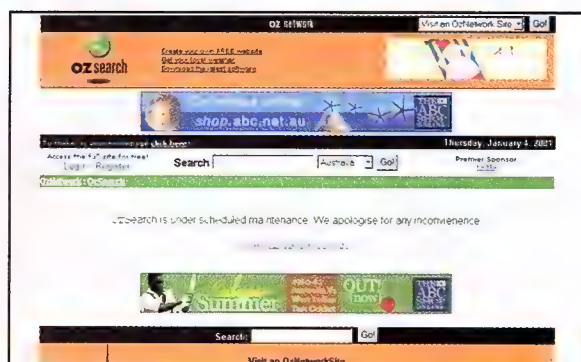
were rare, we did encounter some expired and duplicate links.

Web Wombat proved to be a good keyword search engine. The Australian search results were better than the global results, but considering their relatively small database, it did considerably well.

Yahoo!

www.yahoo.com 

By incorporating Google's Web search



OzSearch is a purely Australian search engine that handles single-keyword searches extremely well.

































Web Wombat's Wombat Search lists relevance ratings alongside each of its results.

engine and the Open Directory Project, Yahoo! handles general searches with aplomb, but complex and natural-language queries are best taken elsewhere. Few tools are provided for refining searches. Although still a solid offering, Yahoo! has failed to keep pace with some of its competitors.

Searches can include Boolean but not wildcard operators, and you're able to limit the search in terms of how recently sites were created. When you input a query, Yahoo! provides six types of results: Inside Yahoo! pages, or original content on Yahoo! itself; subcategories from the Yahoo! directory; par-

Australian Search Engine Evaluation

	Overall	Simple Search	Complex Search
AltaVista			
Answers			
AOL.com.au			
Excite.com.au			
GoEureka			
Looksmart			
Matilda			
OzSearch			
Web Wombat			
Yahoo! Australia			

ticular sites from the directory; sites drawn from the Web at large; matches from Yahoo! News; and matches from Yahoo! Events.

Results from the Yahoo! directory are poor unless your query is relatively simple. The query "best price for Palm Pilot" yielded plenty of Palm hits, but none of the links on the first page mentioned prices. Results from the rest of the Web, provided by Google, are often better, however. And though rare, Inside Yahoo! matches are useful in most cases, especially for current subjects. On our search for the upcoming film Quills, Inside Yahoo! provided a cast list, a synopsis, photographs, and a link to the official site.

Yahoo! AU

www.yahoo.com.au

Like the US search engine, Yahoo! Australia is powered by Google. General searches work well, but narrow and specific searches generate significantly fewer results. The only options provided for customising searches are search method and search area. Although its category search

is strong, Yahoo! lacks the power and tools of many of the other engines.

Boolean searches are supported, along with a variety of search operators, though these make no difference to the generally poor results. Yahoo! displays search results in two sections: results from categories listed in the Yahoo! directory, and Web site matches. Unfortunately, like a number of other search engines, Yahoo! does not display the URLs of the sites listed in the results.

Yahoo! handles general keyword searches adequately, but is much less helpful with more complicated searches.

In a similar fashion to the US, Web results received from Google are much better than those from Yahoo!'s

category directory. A good feature of the site is when the results of a search are displayed, you can click on the "Australian sites" link or the "whole of Yahoo!" to receive refined results, without doing another search. Yahoo! also has an excellent help section.

The screenshot shows the Yahoo! Australia & NZ homepage. At the top, there are navigation links for "All the news @ Yahoo! Sport", "JOBS", and "Let Yahoo! Entertain You". Below these is a search bar with a "Search" button and a link to "advanced search". A section titled "Personalise your browser, free with Yahoo! Companion" offers options for "All of Yahoo!", "Australia only", and "New Zealand only". A large horizontal menu lists various categories: "Auctions", "Finance", "Media", "Computers", "Entertainment", "Personal Finance", "Sport", "Travel", "Weather", "Health", "Education", "Reference", "Shopping", "Jobs", "Real Estate", "Automotive", "Local", "International", "Regional", "Local", "International", "Regional", "Local", "International", "Regional". Below this, there are three main sections: "Yahoo! Shopping - Great Stores. Thousands of products.", "In the News", and "Marketplace". The "Yahoo! Shopping" section lists "Departments" (Books, Electronics, Home Tech, Sports, Toys, Video), "Stores" (Amazon, eBay, etc.), and "Products" (Cameras, Computers, etc.). The "In the News" section lists "National and International News", "Local News", "Sports", "Entertainment", "Technology", "Business", "Health", "Education", "Reference", "Shopping", "Jobs", "Real Estate", "Automotive", "Local", "International", "Regional". The "Marketplace" section lists "Auctions", "Real Estate", "Business", "Health", "Education", "Reference", "Shopping", "Jobs", "Real Estate", "Automotive", "Local", "International", "Regional".



Along with an extensive category directory, Yahoo! Australia features an excellent help section.

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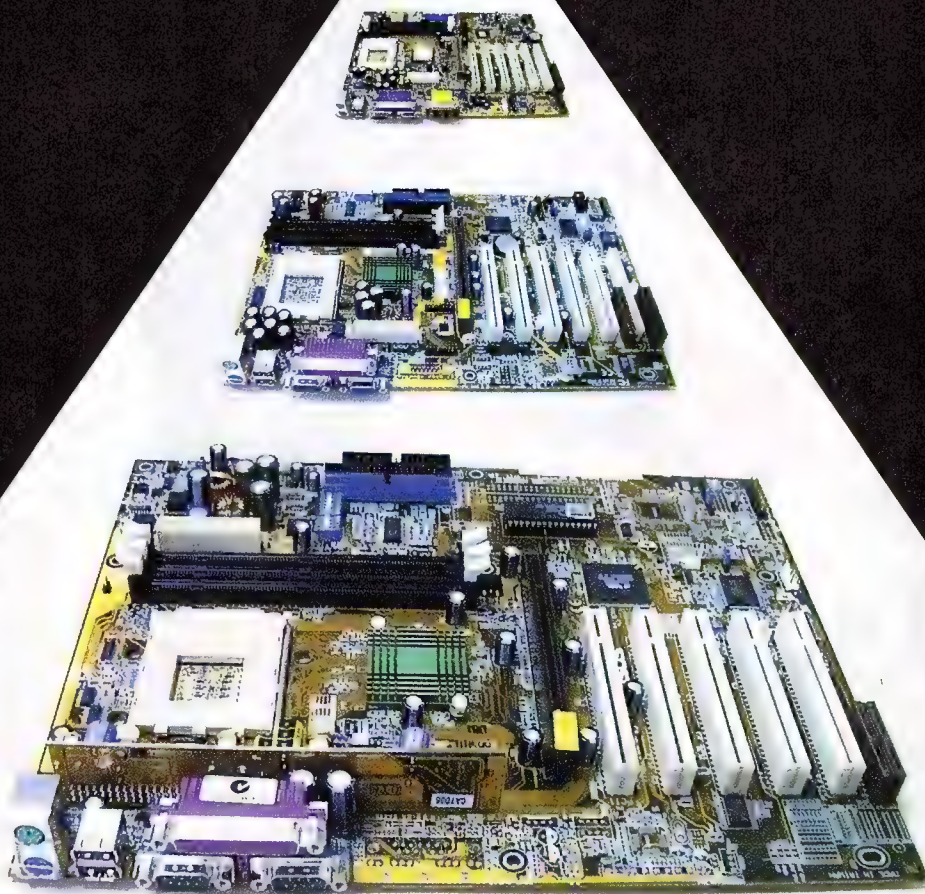
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Making Sense of Motherboards

In this review of 13 Slot 370 motherboards, the RMIT IT Test Lab looks at the features and designs that really make a difference at the most basic level of the PC.

By Steven Turvey, RMIT IT TEST LABS



This is only Part 1 of our motherboard comparison—for those hankering to see the Slot A test results for AMD processors, we're sorry, you will have to wait another month.

As far as slot 370 is concerned, what's available is either Intel's 815 chipset or VIA's Apollo Pro—with just two exceptions: the motherboard from Protac was based on the GFX Pro chipset and, to our surprise, the FIC FB-11 was based on the ageing, but apparently not tiring, BX chipset.

The FB-11 also had the distinction of being the least expensive board in the comparison at just \$195. Mind you, it's not high up in the bells-and-whistles stakes with no audio and only ATA-33, but it certainly no slouch.

The most expensive board tested was the SuperO at a healthy (depending on your perspective) \$440. The median price of the 13 boards tested hovered around the \$283 mark.

ABIT SA6R

Price: \$336. Chipset: Intel 815E. Distributor: Synnex; Ph: 1300 651 665; www.synnex.com.au

In typical fashion, ABit, not satisfied with the features set of the 815E chipset, decided to remedy the situation and add further functionality. The enhancement takes the form of a HPT370 IDE RAID controller that—along with RAID 1, 10+1 mode—also adds an additional two IDE channels to the SA6R. As a consequence, the board can support a total of eight Ultra DMA100 devices.

Layout of the motherboard is better than average with quite clear access for the CPU heatsink clips, all four IDE connectors and the PCI slots. The only

minor irritant is that the DIMM slots are located so close to the AGP slot that cards such as the ASUS V7700 used during testing fouls two of the four DIMM slots. In fact, you must actually remove the V7700 to install or replace DIMMs in slots 1 and 2. ABit claims the

board can accommodate up to 512MB of PC133 SDRAM.

The workmanship and finish of the board is very good, although to be honest, all of the boards tested were of excellent quality. The chipset utilised is the enhanced 815E (see sidebar) and ABit has included a chunky green heatsink on the 82815 (GMCH) chip to promote cooling and reliability. The board has provisions for one CPU fan and a single case fan.

In addition to six PCI slots, one AGP 4x slot and a Communications and Network Riser (CNR) that is located on the far left of the board (looking from the front), the SA6R includes a connector labelled VL1. The VL1 connector can be fitted with an optional riser card to provide composite TV output or connection to a digital flat panel display. Naturally this feature is unavailable if you choose, as we did, to forgo the integrated graphics and install a

dedicated AGP graphics card.

Audio is integrated and includes three internal inputs and the standard array of external line-out, line-in and mic. Thankfully,

the internal connectors are located out of the way of the expansion card slots. Two USB ports are provided, although

an optional connector is available to take advantage of the 815E chipset's additional pair of USB ports.

Most of the connectors, including the front panel connectors, are clearly labelled. Settings of the DIP switch block, however, must be gleaned from the supplied manual (which is, by the way, excellent—with extensive coverage of the hardware and BIOS configuration).

The DIP switch block provides rudimentary CPU speed control in the form of hardware selectable FSB speed of 66, 100, and 133MHz. More important is the ability to prevent the user tampering with the CPU through the BIOS. This is truly child's play, however, when compared to the BIOS Soft-Menu CPU configuration—it provides FSB selection in 1MHz steps from 50MHz up to an insane 250MHz that, for obvious reasons, we did not test. Multiplier settings range from 3x to 12x and the CPU voltage can be adjusted in increments of 0.05V between 1.3V and 1.9V.

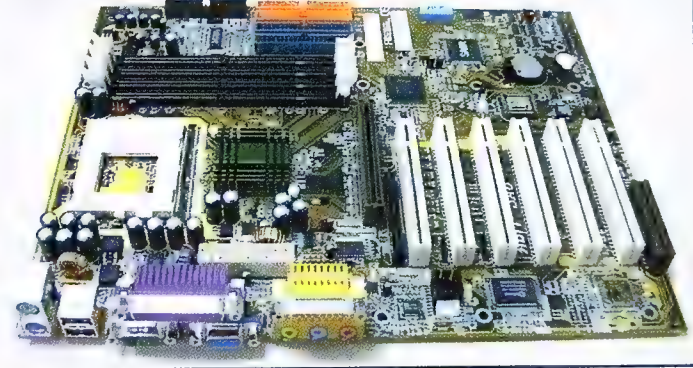
In addition, the CPU/SDRAM/PCI clock ratio can be user selectable in four ranges from 2/3/1 to 4/4/1. To dissuade the overzealous experimenter, there are a couple of prominent warnings regarding the potential damage to your CPU and system from rampant overclocking. At one stage the point is driven home by a collection of eight "skull and crossbones" graphics.

Of course, for the more timid and less cavalier amongst us, there is always the

AOpen AX34 Pro II



ABit SA6R





EDITORS' CHOICE

● Soyo SY-71SA

You don't have to spend a fortune to obtain a good high performance motherboard—three of the better performers in this month's test were in the price range from \$195 to \$239. We are, of course, alluding to the ASUS CUV4X, FIC FB-11, and the Soyo SY-71SA. These three were the fastest in Business Winstone. The Soyo in particular was very strong in 2D and 3D graphics, and it was also the fastest in 3DMark2000 and Quake 3 low detail.

All three represent great "bang for buck" with the FB-11 demonstrating the sheer staying power of the venerable 440BX chipset, but of the three we feel the Soyo SY-71SA is deserving of the Editors' Choice.

For the extreme adventurers amongst us however, who do not mind spending the extra \$100 or so, you would have a lot of trouble passing by the ABit SA6R. The ABit allows the user to select FSB clock frequencies between 50MHz and 250MHz. Mind you, we are a tad sceptical about the chipset's stability at such a high clock speed—needless to say, some pretty exotic cooling is in order. But it does not end there, the multipliers range up to 12x, the CPU core voltage can be tweaked in 0.05V increments and to top it all off the ABit has IDE RAID with the ability to connect up to eight IDE devices. It gets a Merit Award.

option of letting the board auto configure to the processor's default (real) settings. The board includes a connector for an optional thermistor, in addition to the standard fixed CPU thermal monitor, that the user can position for custom temperature monitoring. The BIOS also includes all the system health monitor features you would expect of a board in this class.

Overall performance was above average, particularly in graphics and games performance. Business Winstone performance was just a touch above average. It came as no great surprise that most of the 815E-based motherboards, with a few exceptions, performed similarly.

AOpen AX34 Pro II

Price: RRP \$299. Chipset: VIA Apollo Pro 133A.
Distributor: Servex Australia; Ph: 02 8762 3500;
www.servex.com.au

If there were an award for presentation alone then the AOpen would win hands down. For a start, the board ships with a foldout double-sided A2 Easy Installation Guide, which (using full colour photos) takes you step by step through the installation and configuration procedure. The User's Guide itself runs to 184 pages, though it probably does not contain a great deal more information

than the ABit or ASUS manuals. But the layout and presentation are sensational. Mind you, there were some gremlins lurking during the manual's production, as it quite clearly illustrates the motherboard with four DIMM slots while the body text claims there are only three.

The board itself also "looks" impressive—it's almost black, including the tracks which have a coating of black lacquer and the white legends and silver heatsink on the 82C694 chip, complete with coloured AOpen logo, really stand out.

The layout of the board is excellent, as is the finish. CPU, expansion card and cable installation is a dream with plenty of clearance all round. At first glance, we thought AOpen had stumbled with the location of the four DIMM slots: too close to the

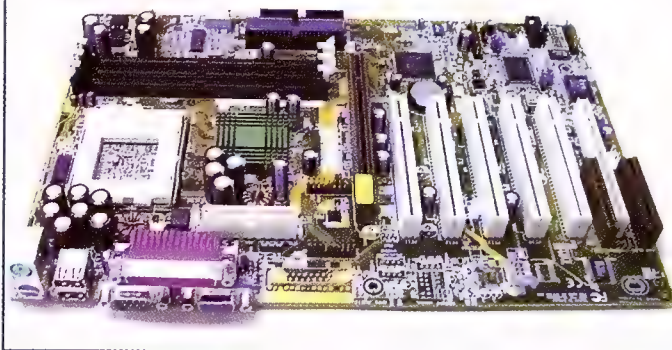
AGP slot. But we were wrong; although it is a tight squeeze, you can actually remove and replace the memory modules without having to remove the AGP card.

The board is based on the VIA chipset and as a consequence, there are two external COM ports in addition to the standard I/O and games and audio ports. There are three internal audio connectors, CD, modem, and video-audio as well as a fourth connector that can supply headphone output and mic input to the front panel of your case, if it includes this feature. In typical "keeping up with the Joneses" (that is, the 815E) style, the motherboard also includes a header and backplate to provide an additional pair of USB ports.

Although the manual is at odds with itself regarding the number of DIMM slots present it does state that each of the slots can accommodate a 512MB module, so we assume that 2GB is the memory limit even though the manual claims it is 1.5GB; still a pretty impressive figure.

Expansion slots run to an AGP 4x, six PCI and an AMR (Audio Modem Riser). In an effort to counter BIOS virus infection, AOpen has noted an amusing feature: the "Die Hard BIOS". It's a jumper that you can connect an external switch to that allows you to switch BIOS write protection on and off without opening the case. (Actually, it's a feature that many motherboards have but they simply call the jumper "BIOS write protect".) Following Gigabyte's trend, the motherboard also includes a second vacant BIOS socket, and an optional BIOS chip can be purchased and used as a backup should the first fail for some reason.

ASUS CUSL2



The motherboard supports up to three cooling fans and while the BIOS supports PC Health Status, it's pretty standard fare: the status of CPU and system temperature, fan speed and the motherboards main voltage rails.

A set of jumpers on the motherboard controls the FSB clock and there are four settings: auto, 133 to 150MHz, 100 to 124MHz and 66 to 83MHz. The actual clock speed can then be fine tuned in the BIOS with a range of around 19 discrete settings between 66MHz and 150MHz. Core voltages between 1.3V and 2.05V are also just a tweak away in the BIOS.

While raw graphics performance was typical for the VIA class of motherboards, slightly lower than the 815E boards in 2D and 3DMark2000, the Business Winstone score was significantly lower. We tracked this result down to much lower than average disk performance; there is obviously a slight problem with the Windows ATA100 that we were unable to remedy before deadline. Business performance was still more than acceptable but we will be hanging out for driver updates from AOpen. Quake 3 performance was very good at both low- and high-detail levels.

Bundled software includes Norton AntiVirus 2000.

ASUS CUSL2

Price: RRP \$329. Chipset: Intel 815E. Distributors: Achieva Technology Australia; Ph: 02 9742 3288; www.achieve.com.au

We have a pair of ASUS motherboards in this comparison, this one is based on the Intel 815E chipset (the CUV4X based on VIA's Apollo Pro 133Z chipset). At first glance, the CUSL2 is a bit short on external I/O connectors with only a single COM port mounted on the board, and although there is provision for an audio Codec, this board did not include one and so also lacks the usual games and audio ports. However, a second COM port connector is provided in a backplate mounted form factor, along

with the additional three USB ports, again in a backplate form factor taking the total USB ports to five. It was nice to see that the additional USB ports were supplied rather than an option as with most of the other motherboards. It should also be noted that a further two USB ports, bringing the total to seven, is supported by the board.

Board layout was clean and uncluttered. Installing the CPU and heatsink should not be a trial, and the AGP Pro port is positioned far enough away from the three DIMM slots to make memory upgrades a breeze. The memory ceiling for the board is 512MB of PC133 SDRAM. Even though each slot can

clearly labelled and should you wish to forgo or disable BIOS CPU configuration, the legend for the DIPswitch block is stencilled on the board beside the AGP Pro slot. Just the five DIP switches alone allow quite flexible setting of the CPU, SDRAM, and AGP clock speeds on their own, but choosing to soft configure via the BIOS really allows you to let your hair down. You can select from 24 FSB speeds between 64.4MHz and an adventurous 200MHz. Multipliers are not quite so wild from 2x to 8x, and the CPU voltage settings range from 1.65 to 1.95V in 0.05 volt increments. A very generous array of CPU/SDRAM/PCI frequency ratios are also provided, no

less than 32 sets, in fact, which will prove very useful if you have a hyperactive CPU and your SDRAM or expansion cards are not quite up to the pace.

The supplied documentation is excellent, clearly outlining the board's features and configuration, including an extensive section on the BIOS and supplied software utilities.

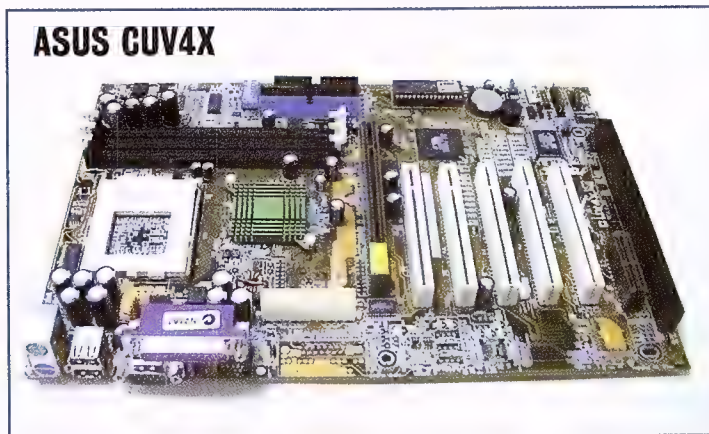
Performance in our graphics and games tests

was typical of the higher performing 815E motherboards. In all but Quake 3 high detail and Winstone the CUSL2 outperformed the VIA-based CUV4X.

ASUS CUV4X

Price: RRP \$239. Chipset: VIA Apollo Pro 133Z. Distributor: Cassa Australia; Ph: 07 5445 2992; www.cassa.com.au

Although based on the VIA chipset rather than the Intel 815E, you can certainly see the "family" resemblance. Indeed the layout, with the exception of the expansion slots, is almost identical right down to the green heatsink on the 82C694X chip. The similar component layout results in a board that is just as easy to install and upgrade, with plenty of clearance around the CPU and three DIMM slots for example. Like the 815E variant, the CUV4X can handle modules up to 512MB each but unlike the CUSL2, you can cram the board with up to three of these modules for a heady total of 1536MB.



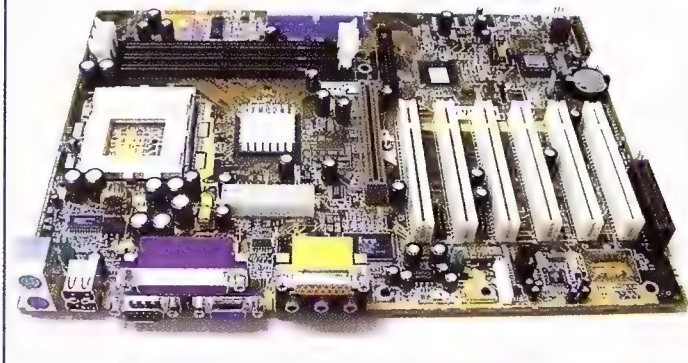
cater for module densities up to 512MB, the manual warns that if the ceiling is exceeded the board may hang during start-up.

Like many of the other "brand name" motherboards, we have come to expect good design and workmanship from ASUS and we were not disappointed. The GMCH of the 815E chipset has an effective green heatsink—the colour of choice for chipset cooling apparently. Three connectors for cooling fans are provided and, while the BIOS monitors the motherboard and CPU temperature, voltage levels, and fan speeds, ASUS also provide a Windows utility called PC Probe that allows you to display and record the health of the PC in just about every way imaginable.

There are a pair of headers on the motherboard to provide digital video out and TV out with an optional module. In addition to the six PCI and AGP Pro slots, the ASUS has not one but two CNR slots.

All the headers and connectors are

Chaintech CT-60JV2



The board has provision for audio but ours did not include it. Also lacking were any rear-mounted COM ports (there is provision for COM1 on the motherboard but no socket was fitted). A single backplate-mounted COM port is provided, as is an additional two port USB backplate.

The board has an AGP Pro and five PCI slots as well as a CNR, and—a perhaps useful relic from the past—an ISA slot all with good clearance. Even the addition of the audio functionality and attendant components should not get in the way of your expansion cards. There are a couple of masks on the board for Electrolytic caps that may foul the lower connectors on some boards—a V7700 Deluxe, for example—but we cannot be sure.

Component labelling is clear and easy to read and should you chose to go the path of hardware CPU configuration via the DIP switch block, there are four tables masked onto the board that clearly outline the multiplier and FSB settings. The hardware config options are quite extensive, offering multipliers between 2x and 8x and 15 FSB clock settings between 66MHz and 150MHz. Software configuration through the BIOS has an identical multiplier range but adds an additional six FSB options, increasing the maximum clock frequency to 166MHz. CPU voltages can be tweaked in 0.05V increments over the range 1.65V to 1.95V. Also “tweakable” are the System/PCI and System/SDRAM frequency ratios.

The supplied manual, while still very good, does not appear to be quite as extensive as the CUSL2's which runs a

to our amazement was based on the old 44BX chipset. Graphics performance was down a tad on most of the 815E-based motherboards, although the CUV4X tapped a hidden reserve to pull ahead in the Quake 3 high detail test.

Chaintech CT-60JV2

Price: RRP \$329. Chipset: 815E. Distributor: Protac International Computers; Ph: 03 9560 7168; www.protac.com.au

Chaintech has quite a long history of being an overclocker's delight but the 60JV2—while quite good—has certainly been overtaken in this department by the likes of ABit and ASUS.

The layout of the motherboard was quite good although there are a few annoying little hitches, our V7700 AGP card managed to be just long enough to foul the first DIMM slot. To remove and replace the memory in this slot, the graphics card must be removed because there is not enough clearance for the locking clip to disengage. Also some expansion cards, if located in PCI slot 3, may prevent access to the CD audio in socket, our Monster Sound card certainly did.

The three DIMM slots, according to the manual, will only ac-

cept modules up to 256MB in size and the upper limit is 512MB. We would certainly advise checking the Web site if you are thinking of purchasing this board because it may just be a matter of time before the board is cleared to operate with the 512MB modules.

The motherboard has provision for two cooling fans and the GMCH was fitted with a small aluminium heatsink, and the BIOS “PC health” monitoring is pretty standard fare.

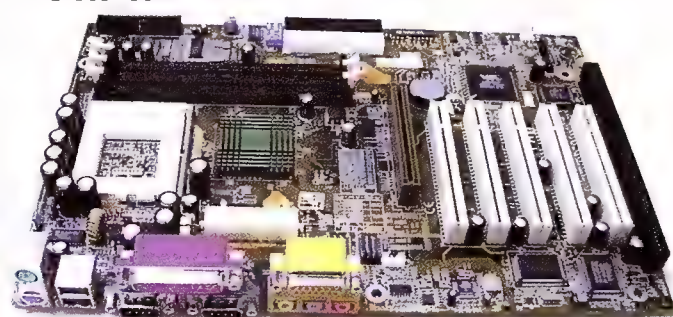
Standard fare is a term that also applies to the expansion slots with an AGP, six PCI and a CNR. External I/O includes games port and audio. The single fixed COM port is supported by the backplate-mounted COM2, supplied with the motherboard. To take advantage of the second pair of USB ports supported by the chipset, an optional backplate, complete with the USB sockets, must be purchased.

Labelling of many of the connectors is not terribly clear and in some cases absent entirely. The front panel connector, for example, is labelled as such but for the identity and functionality of each of the pins, you must consult the manual. This is not quite as bad as it sounds, as a sticker with a diagram of the motherboard, jumper settings and connector functionality, is provided to attach to the inside of your case. Admittedly, the tiny blue on white text may be impossible to read for anyone without 20/20 eyesight.

The manual itself continues the blue text scheme and, at just 34 pages, covers the hardware configuration quite well but does not document the BIOS settings at all.

The motherboard jumpers are certainly easy to locate with their large bright green tops and if you look hard enough,

FIC FA-11



most have their settings tabulated on the motherboard.

Jumpers can be used to set the FSB clock to auto, 100MHz or 133MHz, in addition there are 10 settings between 100MHz and 165MHz in BIOS to get your CPU to really exert itself. Multipliers are in the usual range of 3x to 8x and unfortunately, you cannot tweak the core voltage as this is set automatically by the BIOS.

There were no great surprises on the performance front—business application performance was typical for this chipset, although 3D graphics did seem a tad off the pace with 3Dmark2000 down slightly when compared with similar motherboards. High detail Quake 3, in particular, was around 4fps off the average for the 815E group.

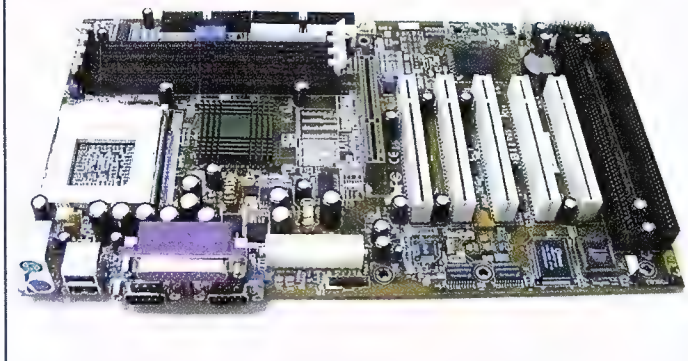
FIC FA-11

Price: RRP \$230. Chipset: VIA Apollo Pro 133A. Distributor: National Computer Supplies; Ph: 03 9761 4777; www.fic.com.tw

We received two motherboards from FIC. The FA-11 is based on the VIA Apollo Pro 133A chipset. The board layout has its ups and downs. Installing expansion cards into any of the slots, which included five PCI and an AG slot (together with a perhaps useless ISA slot) is simple. We were, however, surprised that an AMR slot was not thrown into the mix. The three DIMM slots are positioned far enough away from the AGP slot that replacing modules does not necessitate removing the AGP card as well. What is perhaps more of a concern is the CPU socket, which is closely crowded by capacitors along one corner—this really restricts the type of heatsink that the board can accommodate. Our standard heatsinks supplied with the 866MHz PIII CPU simply would not fit and we had to resort to an old but chunky Celeron heatsink that we had lying around. All components on the board are labelled, some more clearly than others, and there are configuration tables masked on the board for the main DIPswitch block and FSB jumpers.

The 82C694 chip has a heatsink fitted

FIC FB-11



and, other than the CPU fan connector, there is only provision for one more fan on the motherboard. The BIOS monitors nine of the system's voltages, the CPU and system temperature, and fan speeds, and the system shutdown temperature can also be set if desired.

With each of the three DIMM slots capable of handling a 512MB module, the 1.5GB memory ceiling is certainly impressive. And, if the manual is anything to go on, there do not appear to be any rules and regulations concerning double and single-sided modules and their use and placement. On the subject of the manual, it's not a bad piece of work, certainly not up to the likes of the ABit and ASUS, but most of the information you would require is contained within.

The chipset does not feature integrated video, so the external I/O ports include both COM ports as well as the standard games port and audio output. Internal audio connections are a bit lean with just a pair of CD audio inputs, one of which is the old style connector (annoying when most CD-ROM drives nowadays do not cater for this connector form factor). And, although the chipset supports an additional pair of USB ports, this option has not been provided. There is provision on the motherboard for the additional USB header but on our board at least, it was not implemented.

Configuring the CPU multiplier is handled through four of the switches on the DIP block with options from 2.5x to 8x. From the board jumpers the FSB can be set to auto, 66, 100, and 133MHz. There is also a jumper for overdriving the CPU core voltage but it's not clearly documented in the man-

ual. From the BIOS, a total of 12 FSB frequencies can be selected along with a fixed PCI clock frequency that is either one-half or one-third.

Business Winstone performance was down a bit when compared to others of its class, though the reason for this is unclear. The FA-11 had one of the highest disk performance figures and 2D graphics performance was average

for a VIA-based board. 3Dmark2000 results were a touch under par as were the Quake low-detail frame rates, although at high detail, performance was good.

The motherboard ships with a Symantec CD Plus pack that includes: Norton AntiVirus 2000, Ghost and Virtual Drive, in addition there are several other useful applets included on the CD.

FIC FB-11

Price: RRP \$195. Chipset: Intel 440BX. Distributor: National Computer Supplies; Ph: 03 9761 4777; www.fic.com.tw

We must admit the FB-11 came as a bit of a surprise, no Intel 815 or VIA chipset for this FIC baby, or should that be grandpa? The FB-11 is based on the venerable 440BX chipset, which, for our tests, was in fact overclocked from its Intel stated limit of 100MHz FSB to 133MHz FSB to cater for the 866MHz processor used during testing. It would therefore come as no surprise that the North Bridge chip has a chunky little heatsink on it. Even so, during testing it became quite warm, but not hot enough to be a concern. The motherboard has a pair of fan connectors, one for the CPU and the other designated Chassis-Fan. The BIOS tracks the PC's health by monitoring CPU and system temperature, fan speeds, eight voltage levels and has user-configurable CPU warning temperature, and shut-down temperature options.

The FB-11 is actually smaller in size than the FA-11, but it also includes some additional features such as a second ISA slot, bringing the total number of slots to two ISA, five PCI and an AGP. There is also an extra DIMM slot

Intel D815EEA

for a total of four which, according to the manual, can be loaded with 256MB modules for a maximum of 1GB of memory—not too shabby. Now adding the extra ISA slot alone has cluttered the board layout quite a bit, the AGP slot is now uncomfortably close to the DIMM slots but, astonishingly, the modules can be easily replaced without the need to remove the graphics card. The CPU socket has also lost its ring of capacitor “sentries”. There is only a lone cap at the bottom left corner that may still interfere with some heatsinks but none of ours presented a problem.

Component labelling is much the same as the FA-11 and includes tables outlining the settings of the DIP switches and most jumpers.

The external I/O ports are standard fare, parallel, two COM, two USB and PS/2 mouse and keyboard, there is no integrated audio and the BX chipset only supports a pair of USB ports.

CPU multipliers are selected with the on-board DIP switches and range from 2.5x to 8x. The table masked on the motherboard even outlines the CPU clock at 66, 100, and 133MHz, the latter selected by a pair of jumpers. If you wish to overclock then a further seven FSB frequencies are available in BIOS up to 150MHz.

During testing, particularly in the 3D graphics tests, we initially found the FB-11 to be unstable. This was tracked down to an old version of the BX AGP driver in Windows 98SE. An update is available on Intel's Web site. Performance in Business Winstone was unbelievably strong, the FB-11 was the second fastest in this test. This is surprising for a number of reasons; firstly the chipset only supports ATA33 so hard

drive performance was down slightly and although high-end 2D graphics was very good, the 2D business graphics score was a tad low. 3D performance was pretty darned hot as well—the board took second place overall in 3DMark2000 and low-detail Quake 3. It's obvious that there is still plenty of life left in the old 440BX chipset after all (although what long-term reliability of the chipset will be with a FSB of 133MHz is uncertain—but we have yet to hear of an overclocked BX chipset dying!).

The software pack provided with the FB-11 was identical to the FA-11, as was the quality and layout of the User's Manual.

Intel D815EEA

Price: RRP \$289. Chipset: 815E. Distributor: Today Tech; Ph: 02 9888 6611; www.intel.com.au

It is a very unusual occurrence from this vendor, but the first motherboard supplied to us from Intel was DOA. Of course, by the time we discovered this fact and contacted Intel to have a new board shipped, time was quickly slipping away and as you will see, we had a problem or two.

We do have to give credit where credit is due, and the layout of the components on the Intel board is very uncluttered. All the major components can be replaced or upgraded without any dramas. At first we found it curious that the GMCH chip had no heatsink, but then again, you cannot overclock an

Intel motherboard readily, so perhaps the heatsink is only required on the other motherboards because of their overclocking potential (with the higher frequencies naturally generating more heat in the GMCH). The board has provision for three cooling fans and given that you cannot overclock, many of the PC health features found on other motherboards would perhaps be redundant here.

Component labelling was good—there is a small table in the centre of the motherboard outlining the pin configuration of the front panel header. The documentation supplied with the board is pretty thin and only really covers the board's installation procedure. And, even though there is not a lot to “play” with in the BIOS, it is a pity the manual does not also include these details as well. A row of four LEDs at the rear between the single COM port and game/audio ports tracks the bootup sequence, and should a hang or fault occur, you could identify at what stage this happened. Of the 16 possible LED states a full seven are undefined and the documentation of the other defined states is a bit sketchy; MSI, for example, certainly made better use of this concept.

A rather neat pair of stickers is also provided, one to stick on the inside of the case which identifies all the board's major components, the front panel header and BIOS jumper settings, and the other on the rear of the case outlining the external connectors.

In addition to the single COM port and two USB ports at the rear, the motherboard has provision for a second COM port and a second pair of USB ports, but the connectors for these features are an optional accessory, as

MSI MS-6337 (815E Pro) VI

presumably is the connector for the Digital Video header. The motherboard has been designed to provide four internal audio inputs but only three of these have been implemented.

Expansion slot count is a little lower than the norm with just five PCI, an AGP and a CNR slot.

Because we were so pressed for time with this board, we were unable to resolve an issue with the ATA100 Windows drivers. As a consequence, the Business Winstone scores are a bit below average. 2D graphics performance with the GeForce GTS 2 card was very strong, certainly no problem with the AGP driver. Just for the hell of it, we also decided to run the tests with the 815E's native graphics hardware to see exactly how much of an advantage the GeForce bestowed on the motherboard. With the native graphics the Business Winstone score was a good deal lower but still acceptable for day-to-day business usage. The 2D graphics took a significant dive to less than half the GeForce card in both business and high-end flavours.

Performance in 3D was interesting in both cases with the GeForce-equipped board, a touch under average in 3Dmark2000, and a good deal below average in Quake 3 at low detail, but rallying to produce on par frame rates at high detail. And the native 815E hardware? For intensive 3D graphics and gaming, forget it. In 3Dmark2000 the 815E was less than one-sixth of the GeForce and frame rates in Quake 3 were an abysmal 12.5fps and 9.2fps at 1024 x 768 in low detail and high detail, respectively.

MSI MS-6337 (815E Pro) VI

Chipset: 815E. Price: RRP \$275. Distributor: MSI Computer (Australia); Ph: 02 9748 0070; www.msicomputer.com.au

The MSI component layout is not quite as user-friendly as some of the other motherboards. The CPU is a little too close to the four DIMM slots for comfort and, as a result, the

heatsink clip can be a bit tricky to fit in the cramped space. Although, for many of us, once the CPU and heatsink are in place, they're going to stay there for quite a while, but compulsive chip-swappers should beware. The AGP slot is also too close to the DIMM slots and our V7700 graphics card, for example, must be removed to replace modules in DIMM slots 1 through 3.

Even though the motherboard supports up to 512MB PC133 modules, the manual states that the memory ceiling is 512MB in total. The motherboard is also quite finicky about what type of modules can be installed in which DIMM slot as well. For example, DIMM 3 and 4 cannot both be occupied by double-sided DIMMs or the system will not function correctly. If

the second pair of USB ports is located at the front of the motherboard, which would prove convenient if you have one of those neat new cases that feature front-mounted USB ports; a backplate-mounted pair of USB ports is available for the board as an option.

Unlike several of the other boards we tested MSI does not provide a header for TV and digital video output. The board has six PCI slots and a single CNR slot, and most of the components are clearly labelled—the only exception, to our surprise, was the front-panel connector. To hook up the front panel the installer must have a quick flick through the manual which, while adequate, is not as extensive or as easy to navigate as the ASUS or ABit manuals, for example.

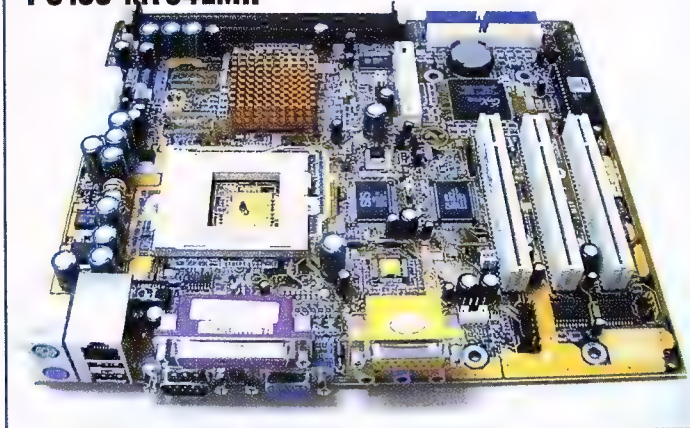
System health monitoring is pretty good and includes the typical voltage levels, fans speeds, and CPU and motherboard temperatures. In addition, MSI provides a thermal probe at the end of 20cm of cable that can be used to monitor your overclocked graphics card's temperature, for example.

When most motherboards fail to fire up you are generally left wondering

what the problem might be and tend to spend your time swapping components until you find the culprit. Well MSI may save you quite a bit of time with its four "Diagnostic" LEDs. The LEDs track the boot up of your system right from BIOS initialisation through testing the RTC, for example, to the final OS boot; so you can easily see where in the boot sequence the motherboard has stalled.

What frequency would you like to set your FSB to? With the MSI you simply type in the value—if you want 153MHz then simply type in 153 and you've got it. The limit is 166MHz but then very few are going to be quibbling that this is not high enough. Multipliers range from 3.5x to 8x and the CPU core voltage can be set anywhere between 1.65V and 1.95V in 0.05V

PC133 M754LMR



you have three double-sided DIMMs and a single-sided DIMM the latter can only go in slot 3, installing it in slot 4 is not allowed.

Overall finish is quite good although MSI has elected not to fit a heatsink to the GMCH chip. The board does support up to three cooling fans however.

The MSI includes integrated audio and the CD, Aux, and modem connectors have been sensibly located so they do not foul any of the expansion cards. With the standard array of external I/O MSI have included VGA, games port and line-in, line-out, and mic but this has only left space for a single COM port. A backplate-mounted second COM port has been provided, which can be installed if the user requires it. A header for

steps. A neat feature of the BIOS is that it instantly displays the resultant CPU, Memory, AGP and PCI bus speeds when you select a weird FSB setting.

The MSI was, in general, a solid performer, generally up amongst the fastest in most tests, the most notable exception being 3Dmark2000 where inexplicably it was one of the slowest of the GeForce GTS 2 equipped cards, but then not by a significant margin.

PC133 M754LMR

Chipset: GFX Pro. Price: RRP \$259. Distributor: Protac International Computers; Ph: 03 9560 7188; www.protac.com.au

The M754 sits on its own amongst the motherboards tested, its tiny form factor certainly helps it stand out, as does the lack of an AGP port. But more specifically, it was the only board based on the GFX Pro chipset.

The chipset bestows on the board a few interesting features. For a start 10/100TX Ethernet is embedded, with an RJ-45 socket sitting astride the two USB ports at the rear. A V.90 fax/modem is also embedded and the motherboard shipped with a small riser card that plugs into a header at the rear of the first PCI slot. Admittedly, you lose a PCI slot (there are only three to begin with) but you gain a modem.

The chipset also supports 3D audio and the obligatory games port and audio I/O is present, although there is only a pair of internal CD audio inputs. There is only a single COM port, IDE peaks out at UDMA 66, and there are only two DIMM slots. The latter is not the hindrance one might expect, as the board will happily accommodate a pair of 512MB PC133 modules for an impressive total of 1GB.

As you can imagine, the board being so small does not have a lot of real estate to host the componentry yet even so the board does not appear cluttered. There is also, surprisingly, plenty of clearance around the CPU, DIMMs, and slots so component replacement is

a snap.

Build quality is good with the GFX Pro 2631A1 chip sporting a very large orange heatsink and support for two fans curiously labelled Fan1 and Fan3. Monitoring of the system health is quite sparse when compared to most of the other motherboards but even so, it does include CPU and system temperature, fan speeds, and a couple of the voltages are monitored for good measure.

Labelling tends to be a bit iffy—the front-panel connector, for example, has no legend and the installer must resort to the small manual that, nevertheless, does a reasonable job of being informative.

The clock multiplier can be selected from a jumper block, complete with a small table of settings masked onto the board, or from the BIOS in the range from 2x to 8x. Given the all-in-one nature of this motherboard, it is obviously not an overclocker's dream and the fact that you only have the FSB frequencies of 66, 100, 105, and 133MHz to select from reflects this assertion. There is also no way to adjust the CPU core voltage manually.

As previously mentioned, the M754 has no AGP slot and so we had to make do with the on-board graphics subsys-

tem, which is apparently based on the TNT2 chipset. The on-board graphics shares the system memory and to at least try and bring the board into line with the other motherboards under test, we selected the maximum of 32MB for the graphics. We should, however, note that the motherboard does have provision for up to 32MB of dedicated surface mount video memory.

Business Winstone performance, while weaker than most, was still far

from unacceptable, which was probably due partly to the good 2D performance—this was far superior to the 815E chipset's native embedded 2D graphics performance. The results in 3Dmark2000 and Quake 3 were, however, abysmal. With scores of 19.1fps and 5.4fps for normal and high detail, respectively, this board is obviously not a good choice for gamers.

It is also worth mentioning that the motherboard also shipped with a reasonable software bundle that included WordPerfect Suite and Gamut—a neat audio station applet that includes an MP3 encoder.



Soyo SY-71SA

Price: RRP \$199. Chipset: 815E. Distributor: SATO Technology; Ph: 03 9899 6333; www.soyo.com.tw

The layout of the Soyo is clean and uncluttered, but part of the reason for this is the lack of several features present on other 815E-based motherboards. For a start, the Soyo does not have a header to take advantage of the chipset's TV out and digital out capability (this may not be important to many of us—some of the other vendors skipped this feature as well). The most annoying deficiency for most users will be the presence of only a single CD-ROM audio input; there is no modem or aux input to be seen.

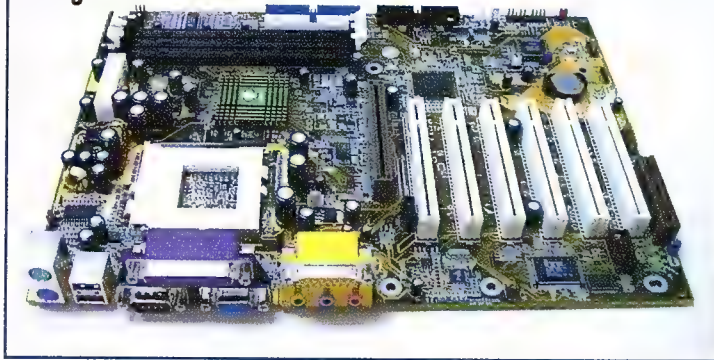
Enough griping, as mentioned the layout is very good and we were able to replace cards, CPU, memory, and cables without running foul of any other components. If you have a graphics card just 1mm longer than our V7700,

though, it will foul the first DIMM slot.

There are three DIMM slots in total with a memory limit of 512MB for the system and up to 512MB individual modules. There are caveats as far as module usage is concerned. For example, double-sided PC100 modules can occupy all three DIMM slots but double-sided PC133 modules can occupy only two slots maximum.

Build quality was very good but labelling was a bit deficient—there were

Soyo SY-71SA



tem, which is apparently based on the TNT2 chipset. The on-board graphics shares the system memory and to at least try and bring the board into line with the other motherboards under test, we selected the maximum of 32MB for the graphics. We should, however, note that the motherboard does have provision for up to 32MB of dedicated surface mount video memory.

Business Winstone performance, while weaker than most, was still far

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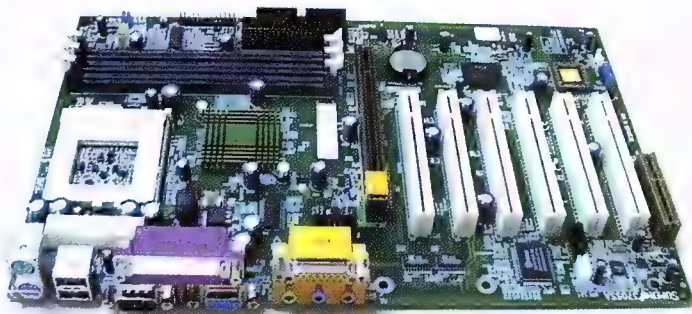
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SuperO 370SSA



no tables outlining the settings of the several jumpers on-board and no legend for the front-panel connector.

The Quick Start Guide is just that and while it should assist in getting the board up and running, there are some obvious errors in the manual. In one sentence the guide states the board has two DIMM slots while in the following sentence the claim that it supports up to three double-sided DIMMs is made. A more substantial manual will be provided on CD (the CD we received contained a PDF file which we presumed was the manual but it simply stated that the manual was not yet completed and would be provided with the official release).

The GMCH has a heatsink attached and the board supports up to three cooling fans while the BIOS health monitoring was fairly typical of this class of motherboard.

Expansion slots are also typical with an AGP 4X, six PCI, and a single CNR slot. There is provision for a second COM port and another pair of USB ports but the riser cards appear to be an optional accessory. The Soyo employs an almost identical system of four debug LEDs to the MSI motherboard. On bootup the four LEDs follow the motherboard status and give an accurate indication, should a hang occur, exactly where the problem lay. The Quick Start Guide has a full-page table outlining exactly what the codes represent and the level of detail in the table is certainly very informative.

The vendor's claims for the motherboard and the

a preproduction version, as the CDs shipped with it certainly claim, and that not all the features were implemented. For example, a representative of SATO Technology claimed that the multipliers ran all the way up to 15x but in the BIOS on our board, we were only able to select from 3x to 8x.

Naturally, you can let the FSB auto configure or if you are open for a bit of adventure simply select a FSB starting point with the jumpers, that is 66, 100, and 133MHz. In the BIOS you can then simply type in the frequency you want in the following ranges depending on the jumper selection, 66 to 99MHz, 100 to 132MHz, and 133 to 166MHz. Unfortunately, on the board we had we could find no way to tweak the CPU core voltage, but this may change with production boards.

The Soyo was the fastest of the 815E motherboards in the Business Winstone test, but not by a large margin, and third fastest overall. This was also reflected in very strong graphics and games scores the fastest overall in 3DMark2000 and Quake 3 low detail,

overclocking settings the BIOS contains are at odds with one another.

We can only presume that the board we received was

for example.

Bundled software includes the Symantec Bonus Pack with Norton's AntiVirus, Ghost and Virtual Drive.

SuperO 370SSA R:1.21

Price: RRP \$440. Chipset: 815E. Distributor: BCN Technology; Ph: 02 9648 0888; www.bcntech.com.au

"Designed in the USA" is stamped on the left side of the SuperO motherboard, and once this would have been a major draw card but with quite a few Asian motherboards having earned a reputation for quality and reliability, it's not such a unique moniker. What does, however, set the SuperO apart from the others is the price of the board—at \$440 it's the most expensive board tested by quite a large margin.

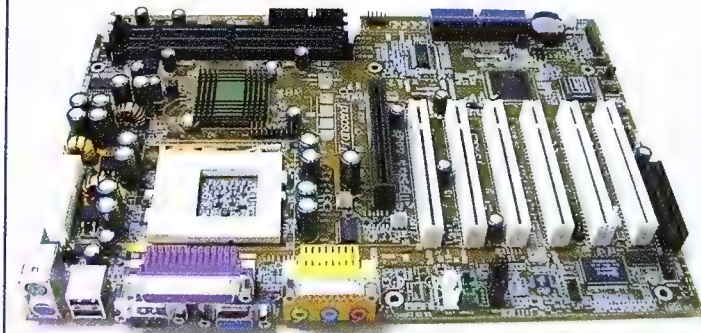
Mind you, the board layout is very good. We were able to install CPU heatsinks, memory, and expansion cards without any problems at all; plenty of clearance around all the critical components. The three DIMM slots are good for up to 512MB of PC133 SDRAM, unfortunately the manual was not terribly enlightening as to the module sizes supported. The manual itself is quite substantial but the layout could certainly be improved, although the index at the front does make it a lot easier to wade through the contents.

Build quality is certainly up to scratch, the GMCH cooled by a heatsink and all the jumpers and connectors are clearly labelled. The board supports up to three cooling fans, which can also be controlled through the BIOS. The BIOS health monitoring is

quite good, keeping tabs on seven different voltage supplies, fan status, and CPU and system temperature including alert and shutdown settings.

Component labelling is exceptionally clear and critical jumper settings such as FSB clock are tabulated on the board as well. I/O is pretty standard with a single COM port and provision for a second, and also a sec-

Transcend TS-ASL3



ond pair of USB ports (the backplate connectors in both cases are an option). SuperO has chosen not to implement the TV or digital output capability of the chipset and therefore lacks the required header. In addition to the CNR and six PCI slots, the SuperO sports an AGP Pro slot to cater for high-end graphics implementations.

Your basic range of FSB clocks can be set with a pair of jumpers on the motherboard. From the BIOS you simply select the CPU multiplier which ranges from 2x to 8x, even the CPU core voltage is auto configured by the BIOS. If you are looking to experiment with overclocking this is not the board for you.

Overall performance was above average for the group but nothing exceptional. In a couple of the tests, notably Quake 3 low detail, the SuperO was a little shy of the mark for an 815E.

Transcend TS-ASL3

Price: RRP \$239. Chipset: 815E. Distributor: Achieva Technology Australia; Ph: 02 9742 3288; www.achieva.com.au

At first glance the Transcend's component layout appears very good: the three DIMM slots are far enough towards the front of the board that only an obscenely long AGP card would foul them. The CPU also has good horizontal clearance but the tall capacitors on either side tend to make installing the heatsink a fiddly, but not impossible, process. Installing an expansion card in either PCI slot 1 or 2 could be a problem if the card/s in question include connectors mounted low on the backplate. In such a case, the connector may effectively block the Aux or CD1 audio connectors.

The finish on the board is quite neat and Transcend has provided legends to all the jumpers on the board. Where there is no room to place the legend beside the jumper, a small arrow is drawn to point to the location of the referenced jumper/s.

Fixed external I/O is standard for an 815E motherboard equipped with the audio feature, and backplate connectors are provided for the second COM port and the additional two USB ports.

The three DIMM slots can accommodate either PC100 or PC133, single


and double-sided modules up to 512MB per module, but the maximum allowable memory is pegged at 512MB.

The GMCH has the almost obligatory green heatsink and there is provision to drive up to three cooling fans. In the BIOS, the temperature of the CPU and overall system can be monitored and warning and system shutdown temperatures set by the user. Naturally, the fans and all the bus and power supply voltages are monitored as well. There is plenty of potential for expansion with six PCI, an AGP, and a CNR slot. There is an enigmatic header on the board that is not referenced at all in the manual and the vendor could not get back to us before deadline with any information, so its function remains a mystery.

Some of the CPU configuration can be performed through hardware with a jumper block that sets the FSB to auto or either 66, 100, or 133MHz, and a second jumper block that can vary the core voltage by plus or minus 10 percent. If you wish to experiment with overclocking the FSB you must first set the on board jumpers to the clock speed you wish to start at. So if you have a 100MHz FSB CPU, for example, you set the jumpers to 100MHz. The BIOS then allows you to select, in 1MHz increments, the FSB speed between 100MHz and 132MHz. Selecting 66MHz gives you the range 66 to 99MHz and (obviously) selecting 133MHz from the jumpers gives a BIOS selectable range of 133 to 166MHz.

The BIOS enables more delicate adjustment of the core voltage than the jumpers with five over-voltage options and two under-voltage options. Transcend decided to leave nothing to chance when implementing its multiplier table, the installer can select from 3x right up to 12x in 0.5x increments.

While the manual does a very good job of outlining the configuration and setup of the board, including screen dumps of the BIOS and Windows driver setup, many of the screen dumps are of such poor quality that the "PC Health Status" screen dump cannot be read at all.

Performance was generally typical for an 815E based motherboard, although we should note that the Transcend was the fastest of all the boards, by at least a couple of frames per second, in the Quake 3 high detail test. 

Chipsets and Features

Intel 815 Chipset

The Intel 815 chipset is designed with integrated AGP 4x graphics, ATA-66 and two-channel audio. It also supports two USB ports as well as PC100 and PC133 SDRAM.

Intel 815E Chipset

The Intel 815E chipset integrates internal AGP4x graphics, LAN, and support for four USB ports. It also supports ATA-100 and six-channel audio for a full surround implementation. Support is provided for PC100 and PC133 SDRAM.

Intel 815EP Chipset

The Intel 815EP chipset also integrates AGP 4x graphics but it uses an enhanced I/O Controller Hub, which delivers twice the I/O bandwidth over traditional bridges. There is also support for an ATA 100 hard disk drive, four USB ports, six-channel audio and it's also LAN-ready. Like the other two 815 chipsets, the 815EP fully supports PC100 and PC133 SDRAM.

VIA Apollo Pro 133A Chipset

The VIA Apollo Pro 133A features a 133MHz front-side bus. It supports 4x AGP, a 133MHz-memory bus and ATA-66. The 133A also features four USB ports, AC'97 Audio and MC'97 Modem.

Intel 440BX Chipset

The 440BX chipset has been around for some time now. It features a 100MHz front side bus and supports a 100MHz-memory bus. It also supports 4x AGP and ATA-33.

How We Tested

Test Rig

Each of the motherboards was configured with an identical set of peripherals and, where possible, memory modules.

The test rig configuration was as follows:

- MTX 250W ATX power supply
- Pentium III 866MHz
- ASUS V7700DDR Deluxe 32MB GeForce graphics card (AGP 4x capable with V3.68 drivers)
- Kingmax 128MB 168-pin PC150 SDRAM
 - PC150-332 Specification
 - Maximum Operating Frequency = 150MHz
 - CAS Latency = 3
 - RAS to CAS Delay = 3
 - Precharge Delay = 2
 - Device Cycle Time = 6.6ns
 - Clock Access Time = 4.5ns
 - On-Board Serial Presence Detect (SPD)
 - JEDEC PC-133 SDRAM DIMM compatible
- Samsung SV2042H, 20.4GB, UltraDMA100 with 5400RPM spindle.
- Pioneer DVD-114 (10x DVD and 35x CD ROM)
- Windows 98SE with any relevant drivers provided by the motherboard vendor installed.

The ASUS V7700 graphics card was supplied by Achieva Technology Australia.

Test Software

Business Winstone2001 V1.0

Business Winstone2001 comprises ten business productivity applications and includes five Microsoft Office 2000 applications (Access, Excel, FrontPage, PowerPoint, and Word), Microsoft Project 98, an e-mail application (Lotus Notes R5), a compression program (NicoMak WinZip), an anti-virus program (Norton AntiVirus), and a Web browser (Netscape Communicator). Business Winstone focuses on the hot spots in its applications—the points that most stress PC performance, and PC users. Some of the hot spots in the benchmark include scanning part of the WSTemp directory with Norton AntiVirus, running a macro to change project dates in Microsoft Project, and updating database views in Lotus Notes. And, as with previous benchmarks, Business Winstone2001 switches tasks between these applications during the test.

In essence, Business Winstone2001 is a system-level, application-based benchmark that measures a PC's overall compatibility and performance when running today's top-selling Windows-based 32-bit applications on Windows 98, ME, 2000 or Windows NT. Business Winstone2001 runs real 32-bit business applications

through a series of scripted activities and uses the time a PC takes to complete those activities to produce its performance scores. Business Winstone2001 tests don't mimic what these programs do; they run actual application code.

WinBench99 V1.2

WinBench 99 is a subsystem-level benchmark that measures the performance of a PC's graphics, disk, and video subsystems in a Windows environment. WinBench 99's tests can only run on Windows 95, Windows 98, and Windows NT systems. WinBench 99 features new, improved graphics tests, improved disk tests, and several all-new tests for all types of storage devices.

WinBench 99's tests are all 32-bit and can only run on Windows 95, Windows 98, and Windows NT systems. WinBench 99's Graphics Playback technology reproduces the graphics operations the Winstone 99 business and high-end applications perform, affording you a better-than-ever measure of your PC's graphics subsystem.

3DMark2000 V1.1by MadOnion

3DMark2000 is a benchmark aimed squarely at gamers and in addition to running full-blown games simulations the utility also tests specific items such as Fill Rate, Texture Rendering Speed, Bump Mapping and High Polygon Count.

More information can be found on their Web site at: www.madonion.com

Games

Obviously we had to throw a game at the motherboards to assess their games prowess and stability in 3D graphics. Our Windows 98SE disk image included DirectX 8.0.

All Games supplied by Mail Order Software Australia, 398 Elizabeth St, Melbourne, 3000. Ph: 03 9663-9111; www.mailordersoftware.com.au

Quake III Arena

Quake III Arena features enhanced detail, when compared to QII, certainly gives the CPU and graphics 3D engine a pounding.

The console command lines for the test are:

Timedemo 1

Then run demo 1 from the menu.

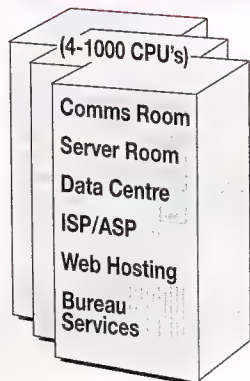
The demo was run at 1024 x 768 resolution with otherwise standard system settings and then again at the same resolution with all the system settings such as detail and colour depth "maxed out".

Benchmark Results

	Winstone	WinBench Bus. Graphics	WinBench H.E. Graphics	3D Mark2000	Quake 3Demo	Quake 3DemoHigh Detail
Abit SA6R	24.2	387	1050	6617	121.8	85.5
AOpen AX34 Pro II	19.0	354	935	6375	119.9	84.5
ASUS CUSL2	24.6	388	1040	6573	121.8	84.1
ASUS CUV4X	27.5	356	940	6544	121.5	85.8
Chaintech CT-60JV2	25.0	376	1030	6405	120.4	79.8
FIC FA-11	22.6	355	932	6328	115.4	83.0
FIC FB-11	26.1	308	1020	6708	125.7	84.9
Intel D815EEA with GeForce GTS 2	21.6	384	1050	6498	109.9	83.5
Intel D815EEA with 815E VGA	17.1	136	479	906	12.5	9.2
MSI 815E PRO	25.0	376	1030	6342	119.7	80.3
M754LMR	21.8	279	832	1218	19.1	5.4
SOYO SY-7ISA	25.2	388	1060	6810	126.6	84.1
SuperO 370SSA	24.7	379	1030	6554	117.8	84.8
Transcend TS-ASL3	24.8	390	1040	6639	122.5	88.5
Average	24.0	363	999	6124	112.5	78.0

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SUMMARY OF FEATURES

Motherboards

Model	ABit SA6R	AOpen AX34 Pro II	ASUS CUSL2	ASUS CUV4X	Chaintech CT-60JV2	FIC FA-11
Distributor	Synnex	Servex Australia	Achieva Technology	Cassa Australia	Protac International	National Computer Supplies
List price (inc. GST as tested)	\$336	\$299	\$329	\$239	\$329	\$230
Address	29-31 Clarinda Road Oakleigh South VIC 3167	5 Figtree Drive Homebush NSW 2140	Unit 7-8, 5 Dunlop Street S. Strathfield NSW 2136	1/14 Hi Tech Drive Kunda Park QLD 4556	Unit 7, 2 Sarton Road Clayton VIC 3168	Unit 5/ 128 Canterbury Road, Kilsyth VIC 3137
Phone number	1300 651 665	02 8762 3500	02 9742 3288	07 5445 2992	03 9560 7188	03 9761 4777
Fax number	03 9540 0588	02 9764 3290	02 9742 3188	07 5445 2069	03 9560 7288	03 9761 4786
Internet	www.synnex.com.au	www.servex.com.au	www.achieve.com.au	www.cassa.com.au	www.protac.com.au	www.fic.com.tw
Warranty	2 years	2 years	3 years	3 years	2 years	3 years
Motherboard revision	1.0	1.0	1.02	1.03	1.0	1.0
Chipset name and manufacturer	Intel 815E	VIA Apollo Pro 133A	Intel 815E	VIA Apollo Pro 133Z	Intel 815E	VIA Apollo Pro 133A
Processor socket name	Socket 370	Socket 370	Socket 370	Socket 370	Socket 370	Socket 370
Processors catered for	Intel Pentium III, Intel Celeron	Intel Pentium III, Intel Celeron	Intel Pentium III, Intel Celeron	Intel Pentium III, Intel Celeron	Intel Pentium III, Intel Celeron	Intel Pentium III, Intel Celeron
Clock speeds	50-250 (selectable)	66, 75, 83, 100, 103, 105, 110, 112, 115, 117, 120, 124, 129, 133, 138, 140, 143, 148, 150	60, 64, 4, 66, 68, 3, 70, 75, 80, 83, 90, 99, 6, 100, 103, 105, 110, 115, 132, 8, 133, 137, 140, 145, 150, 160, 166, 6, 200	66, 68, 75, 80, 83, 3, 85, 90, 95, 100, 103, 105, 112, 115, 116, 118, 120, 124, 126, 130, 133, 135, 138, 140, 142, 144, 146, 148, 150, 155, 160, 166	100, 133, 138, 140, 144, 147, 150, 157, 160, 165	66, 75, 83, 95, 100, 112, 117, 124, 133, 138, 140, 150
Multipliers supported	x3-12	x3-8	x2-8	x2-8	x3-8	Auto, x2.5-8
CPU voltages supported	1.30-1.90	1.30-2.05	1.65-1.95	1.65-1.95	Auto	Auto
Bus expansion slots	1xAGP, 6xPCI, 1xCNR	1xAGP, 6xPCI, 1xAMR	1xAGP Pro, 6xPCI, 2xCNR	1xAGP Pro, 5xPCI, 1xISA, 1xAMR	1xAGP, 6xPCI, 1xAMR	1xAGP, 5xPCI, 1xISA
BIOS name and version	Award Modular V6.0	Award Modular V6.0	Award Medallion V6.0	Award Medallion V6.0	Award Modular V6.0	Award Modular V4.51
Embedded Hard drive controller supported modes	UDMA 33/66/100 (Supports RAID)	UDMA 33/ 66/100	UDMA 33/66/100	UDMA 33/66	UDMA 33/66/100	UDMA 33/ 66
DIMM total	4	4	3	3	3	3
RIMM total	-	-	-	-	-	-
Maximum system RAM	512MB	2048MB	512MB	1536MB	512MB	1536MB
RAM types/speeds supported	SDRAM/ PC100, PC133	SDRAM/ PC100, PC133	SDRAM/ PC100, PC133	SDRAM/ PC100, PC133	SDRAM/ PC100, PC133	SDRAM/ PC100, PC133
Ports: S/P/USB/PS/2	1, 1, 2, 2	2, 1, 2, 2	2, 1, 2, 2	1, 1, 2, 2	2, 1, 2, 2	2, 1, 2, 2
Other Ports	VGA	-	-	-	-	-
External sound connectors	Line in, Line out, Mic in, Games	Line in, Line out, Mic in, Games	-	-	Line in, Line out, Mic in, Games	Line in, Line out, Mic in, Games
Other hardware options fitted (video, sound)	Inte 815E, AC 97 Codec	AC 97 Codec, 2nd USB connector (2xUSB)	-	-	AC 97 Codec	Creative CT5880



FIC FB-11	Intel D815EEA	MSI 815E PRO	PC M754LMR	SOYO SY-7ISA	SuperO 370SSA	Trandscend TS-ASL3
National Comp. Supplies	Todaytech	MSI Computer Australia	Protac International	SATO Technology	BCN Technology	Achieva Technology
\$195	\$289	\$275	\$259	\$219	\$440	\$239
Unit 5/ 128 Canterbury Road, Kilsyth VIC 3137	Unit 1, 6-8 Byfield St, N. Ryde NSW 2113	18/ 28 Vore Street Silverwater NSW 2128	Unit 7, 2 Sarton Road Clayton VIC 3168	8A, Clarice Road Box Hill South, Vic 3128	51 Hill Road Homebush NSW 2140	Unit 7-8, 5 Dunlop St S. Strathfield NSW 2136
03 9761 4777	02 9888 6611	02 9748 0070	03 9560 7188	03 9899 6333	02 9648 0888	02 9742 3288
03 9761 4786	02 9888 6655	02 9749 0799	03 9560 7288	03 9899 0200	02 96480999	02 9742 3188
www.fic.com.tw	www.intel.com.au	www.msicomputer.com.au	www.protac.com.au	www.soyo.com.tw	www.bcntech.com.au	www.achieve.com.au
3 years	3 years	2 years	1 year	2 years	2 years	2 years
1.0	D815EEA	1.0	1.0	F	1.21	1.0
Intel 440BX	Intel 815E	Intel 815E	GFX PRO	Intel 815E	Intel 815E	Intel 815E
Socket 370	Socket 370	Socket 370	Socket 370	Socket 370	Socket 370	Socket 370
Intel Pentium III, Intel Celeron	Intel Pentium III, Intel Celeron	Intel Pentium III, Intel Celeron	Intel Pentium III, Intel Celeron	Intel Pentium III, Intel Celeron	Intel Pentium III, Intel Celeron	Intel Pentium III, Intel Celeron
66, 75, 83, 100, 103, 112, 124, 140, 150	66, 100, 133	66-99, 100-132, 133-166	66, 100, 105, 133	66-99, 100-132, 133-166	66, 100, 133	66-99, 100-132, 133-166
Auto, x2.5-8	Auto	x3-8	x2-8	x3-8	x2-8	x3-12
Auto	Auto	1.65-1.95	Auto	Auto	Auto	+0.05, 0.1, 0.2, 0.3, 0.4 - 0.05, 0.1
1xAGP, 5xPCI, 2xISA	1xAGP, 5xPCI, 1xCNR	1xAGP, 6xPCI, 1xCNR	3xPCI	1xAGP, 6xPCI, 1xCNR	1xAGP Pro, 6xPCI, 1xCNR	1xAGP, 6xPCI, 1xCNR
Award Modular V6.0	Intel P09	Award Modular V6.0	AMI 1999	Award Modular V6.0	AMI V7.0	Award Modular V6.0
UDMA 33	UDMA 33/66/100	UDMA 33/66/100	UDMA 33/66	UDMA 33/66/100	UDMA 33/66/100	UDMA 33/66/100
4	3	4	2	3	3	3
1024MB	512MB	512MB	1024MB	512MB	512MB	512MB
SDRAM/ PC100, PC133	SDRAM/ PC100, PC133	SDRAM/ PC100, PC133	SDRAM/ PC100, PC133	SDRAM/ PC100, PC133	SDRAM/ PC100, PC133	SDRAM/ PC100, PC133
2, 1, 2, 2	1, 1, 2, 2	2, 1, 2, 2	2, 1, 2, 2	2, 1, 2, 2	2, 1, 2, 2	2, 1, 2, 2
	VGA	VGA	VGA, 10/100, Fax/Modem Module	VGA	VGA	
-	Line in, Line out, Mic in, Games	Line in, Line out, Mic in, Games	Line in, Line out, Mic in, Games	Line in, Line out, Mic in, Games	Line in, Line out, Mic in, Games	Line in, Line out, Mic in, Games
	Intel 815E, Creative SB PCI 128	815E, AC 97 Codec	GFX PRO, PC 98 Codec	AC 97 Codec	815E, AC 97 Codec	AC 97 Codec

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Check your local Newsagent.

Bladeschool

www.bladeschool.com.au; Description: Bladeschool is a skate shop that sells a variety of inline skates, skateboards, skis, and scooters.

The Bladeschool Web site is a supplement to the bricks-and-mortar skate shop, located in Frankston, Victoria. The site is divided according to product categories, the main ones being Skiboards, Aggressive, Scooters, Hockey, and Recreation.

All these sections include pictures and prices of the various products, as well as links to the home pages of the different brands. Skiboards includes snowboards and skis, Aggressive lists a range of inline skates, Scooters is self-explanatory, Hockey contains both ice and inline hockey products, and Recreation features inline skates and protective gear.

Cool features of the site are the VR Shop Tour, a

panoramic image of the store, and Skater Profiles, which contains photos of local skaters doing tricks. (If you take a photo and some information about yourself to the shop, they will put you on the site.)

Other sections of the site include the Search area, which allows you to search the Bladeschool site or the Web, through one of ten well-known search engines. A list of related links is also provided. A Specials page shows the price and picture of each product on special, with each item linked to the brand's Web site.

The Protective section contains safety gear like kneepads and helmets, while Clothing lists a range of the shop's clothing. The Accessories category features items from wheels and bearings to magazines and videos. The Catalogue is an extensive list of the shop's products—none of which have pictures, although prices are

mentioned—this section can also be searched.

Unfortunately, there is no handy "buy" button on the site—purchases must be made via the order form, accessed through the "Orders" link, or by clicking on "call us now", which allows you to make an Internet phone call to Bladeschool. No credit card details are required on the order form, as Bladeschool promises to ring back to confirm your order and obtain your card number. Payments can also be made via bank cheque, money order, or C.O.D. No delivery charges apply to orders over \$200.

Another interesting feature of the site is "Chatabox", which helps answer any questions. You can even choose from four different characters when conducting your chat. Questions will be answered immediately, though you are directed to the site's search page if the Chatabot doesn't know the answer. There is also



Products Online

Diary Defender

Xaltra ShockWare; Download price: Free; <http://xaltra.bizland.com>

Diary Defender is the newest addition to the Xaltra ShockWare range of applications. This freeware program offers a multi-user, password-protected diary, allowing several people to keep their diary on a shared computer. It's new features include: printing, view next and last diary entry, and improved editing functions.

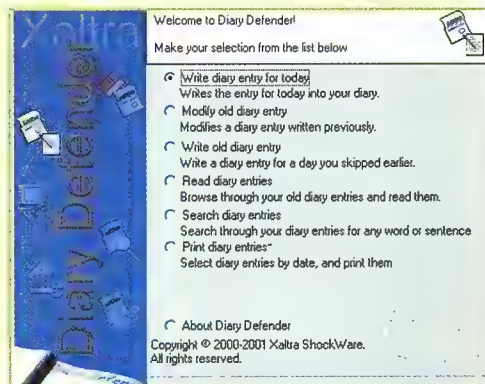
The user-interface, built up by wizards, makes Diary Defender an easy program to use and understand. The main window allows you to write today's diary entry, modify old entries, write diary entries that were previously skipped, and read the ones you wrote earlier. The user-wizard handles multiple users on a single computer, allowing you to add new users, remove old users and alter the password.

Diary defender also supports the inclusion of images, customisation of colours and fonts, prints your entries, and reminds you if you've forgotten to write a diary entry for the day.

There is no longer need to hide that diary key in your sock draw. Diary Defender 1.25 runs as a convenient

icon in the System Tray and is an easy, safe, and pleasurable way to record your day's events.

—Rosina Di Marzo





the option of speaking to a live operator. Finally, Help&Info provides an assortment of links to various parts of the site, a history of the shop, and information on local Victorian street skating spots.

—Olga Jevdic

View Sydney

www.viewsydney.com; Description: Take a live look at Sydney Harbour and its surroundings.

Sydneysiders know that their harbour is the most beautiful in the world—now thanks to the View Sydney webcam, the rest of the world can see this for themselves.

On the site, you can choose to view from one of two different webcams. One camera overlooks the Har-

bour Bridge and Opera House, the other gives you views of the city skyline, Circular Quay, and The Rocks.

The most special feature is the ability for viewers to take control the webcams. By clicking on the “Control Webcam” button, you are given two minutes access to the Webcams. If traffic to the site is high, you’ll be put on a queue while a timer counts down the minutes until you are given access to the cameras. Once you have access you can pan across the harbour, even zooming in and out.

As well as the live webcams, you can also take a screenshot of the current view, take a look at archived

harbour shots or view special events footage. Special events that have been recorded and stored include views of the harbour bridge during the New Year’s fireworks display and footage of the harbour during the Olympics.

—Anna Raciti

Australian Music Centre

www.amcoz.com.au; Description: A site that provides information about Australian music, composers, and performers.

The Australian Music Centre is a Sydney-based organisation that was set up to facilitate and encourage the performance and understanding of music by Australian composers worldwide. Their online presence provides a forum for the

world, and fellow Australians, to see what’s happening in an area of music that is rarely publicised.

The site is broken into three sections: Resources, The Centre, and Membership. In Resources you can find the biographies of composers, lists of composer and performer opportunities, journal articles, the latest discussion topics, and the Australian Music Calendar Online.

Membership is available for a fee. Membership benefits include access to the centre’s library, monthly mailings and discounts in the Australian Music Centre’s store.

The online shop holds a number of goodies. You have the option of browsing the shop, taking a look at the sale items, or downloading the catalogue to browse through



Products Online

TextAloud MP3

NextUp Technologies; Download price: US\$19.95; Free trial version available; www.nextuptech.com/TextAloud

Want more time to yourself away from your computer? Wish you could have your e-mail read to you while you work? Well, now you can.

TextAloud MP3 is a text-to-speech program that

converts any text into spoken words. The program can read out e-mail, Web pages, and documents, and sits in your system tray until needed.

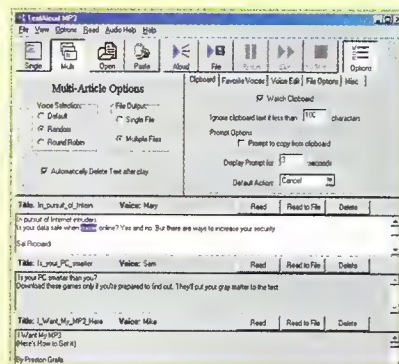
The program works by monitoring the Windows clipboard, and immediately reads out any text clipped to it. Text is stored as an “article” and can be clipped as a Single-Article or Multi-

Article. You can also save any text in WAV or MP3 format for listening at your convenience, or for downloading onto a portable MP3 player.

The program is easy to use, with a familiar VCR-type interface. TextAloud is available in seven different languages, and different voices can be downloaded for

free from the NextUp Technologies Web site.

—Olga Jevdic



Win Australia's Fastest Intel[®] Pentium[®] 4 PC— Valued at \$7000

In the May 2001 issue of *PC Magazine Australia*, we'll be announcing the winner of the "Fastest Intel Pentium 4 Processor-based System in Australia" Competition (as tested by RMIT IT Test Labs). And one lucky *PC Magazine Australia* reader will win this system (valued up to \$7000). To enter, tell us in 75 words or less how you would use such a high-performing, gutsy PC.

Register your entry at <http://www.it-testlab.com/intel> or fax your entry to *PC Magazine Australia* on 02 9955 8871. Competition closes March 31st 2001.



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Take the Intel Pentium 4 Challenge

Intel is inviting PC vendors and manufacturers across Australia to participate in the Intel Pentium 4 Processor Challenge. The mission is simple. Vendors are required to build the fastest Intel Pentium 4 processor based PC system for under A\$7000. Performance will be measured against a set of key benchmarks. The five best performing PCs will be reviewed in the May edition of *PC Magazine Australia*. The winning system will be purchased by Intel and awarded to one lucky *PC Magazine Australia* reader. Get the details on how to enter plus tips and tweaks at <http://www.it-testlab.com/intel>. Vendor submissions close 28th February 2001.



at your own leisure. Payment is by credit card.

The site also offers information about the centre, its opening hours, contact details, projects being undertaken and all the latest news from within the Australian music scene.

—Rosina Di Marzo

Mambo

www.mambo.com.au, Description: Mambo, one of Australia's surf and street wear companies, has an online presence where you can view, and buy, all the summer essentials.

The sun is shining, the smell of sunscreen is wafting through the air and the waves are beckoning us to pack our towels and head for the beach. Mambo's Web site provides a range of clothing and accessories for the quintessential Australian Summer.

The Mambo Supermarket, accessible from the Mambo Australia home page, allows you to browse from a range of men and women's clothing as well as a range of accessories including watches, bags, and books. Each category provides only a limited choice of products. For example, in Goddess Bottoms you are only provided with the choice of two pairs of pants, however men's and women's tops yield more variety.

When you click on an item of interest you are given the opportunity to select size, colour, and second choice colour. In some instances you are also provided with information about the fabric, or in the case of bags, details about capacity, water resistance, and so on.

You are provided with an enlarged picture of the item, however the inability to view the reverse side of clothing or the alternate colours available might be considered by some as a disadvantage.

Payment is by credit card and delivery within Australia is charged at \$8 for next day delivery. If you want the goods sent overseas, International Economy Airmail (3-4 weeks) is also \$8, or International DHL Courier (3-7 business days) is available for \$25.

The site is colourful and easy to navigate. The Mambo home page is also worth a look. It contains a quirky and humorous News Archives section, together with competitions, profiles of Mambo artists, E-Cards, and the Collectibles section which provides a little history about classic Mambo designs that have become recognisable icons in Australian surf and street wear.

—Rosina Di Marzo

Impact Records

www.impactrecords.com.au; Description: Impact Records is a music retailer that also sells a variety of music-related merchandise, as well as books, comics, toys, collectibles, clothing, software, DVDs, and videos.

Impact Records is an independent music retailer that also sells a variety of other products, most of which are music-related. The Impact Records Web site provides an extensive range of Australian and imported music, and allows you to make special requests for items you can't find.

The Impact site is updated daily and the home page lists the featured album and current favourite. Links to the different sections of the site are also provided, with the online shop the most prominent—the various product categories are also listed, so you can go directly to what you want, without conducting a search.

The search function is excellent—each different product category has its own unique search, with results organised alphabetically.

The Impact online shop is very intuitive. All the categories appear on the left-hand side of the screen at all times, and search results appear as a list. To order, you simply tick the box next to the item you

want to buy and your shopping bag will open, displaying all its contents. Items are easily removed by changing the quantity to zero. Unfortunately, pictures and information are not available for all items, and this is particularly a problem when purchasing clothing.

Once you proceed through the checkout, you can select a payment option. Registered customers avoid having to type in their details, and have the ability to check on the status of their orders. If you choose not to register, you must enter all your details. You also have the option of calling Impact and ordering over the phone, as well as printing out the order form and sending it via mail or fax. Cheques and money orders are accepted, along with credit cards.

Impact also offers a number of specials and promotions on compact discs. Latest release books are also listed alphabetically on the site, and you can view the current ARIA albums and singles charts. An excellent feature of the site is the Australian music section, (although a few international bands have mysteriously been added). A huge list of bands is available, with links to each band's products and home page (where applicable).

—Olga Jevdic



MechWarrior With a Vengeance

MECHWARRIOR 4: VENGEANCE

Based on the Battletech pen-and-paper game, the MechWarrior series has become more popular than the original game ever was. The latest action-packed addition to the series is actually a departure from the previous games. It can be dangerous to meddle with a successful franchise, but in the case of **MechWarrior 4: Vengeance**, the changes are for the better.

The MechWarrior series focuses on combat between mechs, which are giant mechanised robots with human pilots. You control one of these mechs from a first-person (or third-person) perspective. Mechs come in different sizes and are armed with a variety of weapons, but the point is always the same: blow things up. The game is more complicated to play than shooters because of the skill required in piloting the mechs, but it isn't as technically involved as some military simulations. In this respect, MechWarrior 4 does a good job of emphasising action without compromising the basic military simulation feel. It's a difficult balance, but the game pulls it off.

The graphics are absolutely superb. A configuration utility lets you choose the options that will maximise the frame rate on your machine, and those with a decent processor and a fast video card can enjoy beautiful terrain, detailed mechs, and spectacular explosions and weapon effects. The visual impact of the game is heightened by the fact that the mission maps are

varied and appropriately decorated with trees, buildings, and the like. Also, because of the addition of smaller vehicles such as tanks and missile launchers, the game conveys the sense that you're piloting something enormous. In short, the graphics really enhance the game.

The audio supports the game's visuals with appropriate sounds of missiles, lasers, and a range of other effects. You'll also notice the sounds made by the mechs as they walk over different terrain. If the game's audio has a weakness, it's that the lack of radio chatter makes the single-player campaign sound somewhat sterile. Of course, this isn't an issue in multiplayer mode.

MechWarrior 4 has an expanded campaign that contains more than 30 missions in a variety of environments. You play as the sole heir of the House Dresari, and you are tasked with restoring Davion rule in your homeworld of Kentares IV. Starting from a secret base on a moon orbiting the planet, the campaign takes you through arctic, alpine, desert, and swamp environments before ending in a series of titanic clashes in an urban jungle. The cutscenes between missions are acted out well and move the story along nicely, while the various lancemates available to choose from have well-devel-

oped personalities, and notable strengths and weaknesses in combat. The key to the campaign is salvaging destroyed enemy hardware as you go along so that little by little, you get to design new mechs for use in subsequent missions. The pace of salvage ensures that you won't have the really big mechs available to you until

game types to choose from—one of the most popular is team attrition, where two teams of mechs score points for killing each other and inflicting damage within a given time limit. Another is team destruction, where the focus is on kills only. Jumping into a game is easy as long as there are openings in the game session. The multiplayer mode is definitely the high point of the game.

MechWarrior 4's mechs seem easier to pilot than those in the previous game. While there's definitely a learning curve to MechWarrior 4, new players will find it easy to get used to the controls. Nevertheless, combat is anything but a mindless shootout—it strikes a virtually perfect blend of pure action and simulation.

Combat is fast, furious, and intense, but shrewd tactics and skillful piloting will increase your longevity on the battlefield. Regardless of your skill level, you'll always see plenty of action, since destroyed mechs immediately respawn at full strength.

MechWarrior 4 makes it easier for new players to get involved, but still preserves the essential elements that make it intense and so much fun. It's a fantastic introduction to the MechWarrior series for those who haven't yet discovered it, and it should have enough depth to keep veterans involved for a long time.

—Bruce Geryk



MECHWARRIOR 4: VENGEANCE

Price: \$99.95; Microsoft;

Ph: 13 20 58; www.microsoft.com.au

you need them.

There is a good mix of offensive, defensive, and recon missions during the campaign, all with varied objectives, but none of them are particularly difficult. Experienced MechWarriors might be somewhat disappointed at the ease of the campaign, even on the highest difficulty level.

One of the biggest attractions is being able to design your own mech and to test it against those designed by others in multiplayer combat. Players will find MechWarrior 4 to be a superlative multiplayer game, as the multiplayer support is excellent, and there are many

Pac-Tastic Adventures

PAC-MAN: ADVENTURES IN TIME

When the original Pac-Man hit arcades well over a decade ago, it was an instant hit because of its distinctive graphics and simple, yet challenging—and addictive—gameplay. The latest effort, **Pac-Man: Adventures in Time**, is an attempt to bring Pac-Man back to his roots, but with surprisingly solid 3D graphics, good level design, and a few new gameplay features.

The most impressive aspect of the game is the graphics. The colourful 3D graphics and the overhead perspective do a great job of giving a brand-new appearance while retaining the simple colours and shapes of the original game. The game effectively uses some full-motion video effects in some of the later stages, and you'll notice subtle lighting effects that highlight Pac-Man's robust shape.

Pac-Man's transition into a 3D world introduces some new twists to the classic gameplay. Instead of restrict-

ing a stage to a single flat maze, you can make Pac-Man run up walls, slide down or climb up hills, and use elevators to reach different platforms. These new features are incorporated seamlessly into the traditional gameplay, thanks to the game's solid level design. For instance, obstacles are used in such a manner that they don't just block your progress, but they are actually a well-integrated part of the level. There are even environmental objects within the levels that can aid you in your task. In addition, different types of terrain in each of the levels can cause Pac-Man to slow down and speed up, which can make it challenging to judge how close you are to one of the ghosts or an obstacle—especially in the later levels when the ghosts speed up.

Pac-Man has a number of new abilities to help him navigate the terrain and capture pellets. You can make him jump to avoid ghosts, boulders, or any other dangerous obstacles that might be in your way. Unfortunately, he doesn't get to use his new abilities often because it is

The game offers three multiplayer modes. The best is ghost tag, where you must tag your opponents in order to change back into Pac-Man and capture enough pellets to beat your competitors. There is no online player-matching service included, but **Adventures in Time** has a hot-seat option for four players at one computer, and you can play against computer-controlled opponents.

Pac-Man: Adventures in Time attempts to take the classic Pac-Man formula and adapt it to a 3D world, and succeeds while still retaining the classic sense of the original game. The single-player lev-

els—as well as the multiplayer modes and minigames—all keep **Adventures in Time** from becoming repetitive too quickly, though in essence, it's still just a remake of the classic Pac-Man.

els—as well as the multiplayer modes and minigames—all keep **Adventures in Time** from becoming repetitive too quickly, though in essence, it's still just a remake of the classic Pac-Man.

—Giancarlo Varanini



Demented Trivia Fun

YOU DON'T KNOW JACK: 5TH DEMENTIA

The latest installment in the trivia game series, **You Don't Know Jack: 5th Dementia**, pits you against up to two other human opponents to win as much cash as possible—your job is to answer trivia questions quickly and correctly.

5th Dementia has a simple, but elegant and highly polished presentation, well-written trivia questions, and a great host. What distinguishes this from previous games in

the series is the inclusion of an online play component.

There's a large variety of funny, animated characters available, and these various characters react depending on whether you get questions right or wrong.

The game opens with an announcer who explains the simple rules and gives you the option of network or single-computer play. Each time you play, you will progress through a sequence of 15 questions.

Online play couldn't be

easier. The game can automatically match you up with a couple of random opponents, though you can create your own game room if you're planning to take on your friends online. The online play is probably the best thing about the game.

You Don't Know Jack: 5th Dementia is an excellent party game, but its online play component also makes it ideal even when other people aren't at home. It's highly entertaining and

even maybe a little educational; especially since you can share the fun with complete strangers.

—Greg Kasavin



Not As Powerful As the Original

CALL TO POWER II

In many ways, *Call to Power II* is probably what the first *Civilization: Call to Power* was meant to be. Many people abandoned the first one due to its clumsy interface, which seemed to defy all logic and convention. The interface in *Call to Power II* is tremendously improved. The dialog boxes are better organised, buttons can be moved easily between the various summary screens, and everything is much more intuitively laid out. Therefore, those players with even a passing acquaintance with the first game will be able to jump into *Call to Power II* without much trouble.

The graphics have also been given an overhaul, and while they are almost identical in style to those in *Civilization: Call to Power*, they've been cleaned up—so now, they look very attractive. In addition, the animations and many of the sounds are extremely well done. Visually, *Call to Power II* is excellent.

One of the biggest changes to the *Civilization* system in the original *Call to Power* was the removal of some of the city-specific micromanagement, which was intrinsic to the whole concept. Instead of clicking through every city to adjust whether an individual worker was on a grassland or a plains tile, *Call to Power* introduced the concept of "public works". You'd designate a certain percentage of an empire's tax income to go to public works, and you'd use this pool of cash to construct tile improvements. These can be made to any tile within a city's sphere of influence, and they don't require a specific worker to use them. Instead, a city

reaps the benefits of tile improvements as a function of population size.

Most empire-building games focus heavily on micromanagement, and have dozens of individual factors that need to be taken into account. *Call to Power II* streamlines this by eliminating other things, like individual city support for military units.

The diplomacy system has been revamped as well, and it's one of the most robust additions to the game. Multipart diplomatic overtures can be made, and proposals can have multiple parts and quid pro quo exchanges. You can choose a "tone" to set with your approaches, and everything you do in the diplomatic arena affects the other nations' regard for your own. The only problem with this aspect is that you receive far less feedback on your overtures than you put in. Complex proposals are met with simple responses like "your proposal has been rejected," without any indication of why or what it means for future relations with that power.

The victory conditions have also been adjusted. Instead of just the three all-conquering objectives of the original, *Call to Power II* allows for a peaceful victory, in which a nation achieves a permanent alliance with every other nation in the game. The alien-cloning victory of the original *Call to Power* has been replaced by a science victory, in which your goal is to

build the Gaia Controller and all of its components. This is much like the Alpha Centauri victory of the very first *Civilization* game.

Call to Power II introduces the concept of flanking units, which are not as strong as melee units by themselves—but they greatly enhance the power of melee units when the two are combined. The combat system is still hampered by the fact that you have no control

against corporate branches by filing injunctions almost seemed like a caricature of an empire-building game.

These game-balance issues were exacerbated by the fact that the original *Call to Power* lasted until the game-year AD 3000. *Call to Power II* shortens the game to AD 2300, which reduces the length of time that these units are in play. As before, there is such a wide variety of threats inherent in the endgame that it's impossible to defend against every one of them. However, the computer opponent in *Call to Power II* is weak enough that you'll probably wipe the map with your armies before the enemy has a chance to deploy any of the more unusual weapons—except on the very highest levels.

Call to Power II has a lot of replay value. There are individual scenarios, a random map generator, and a stable multiplayer option. In the end, playing *Call to Power II* seems like driving a car with a rebuilt engine: the first one failed, and while you'll get some more life out of the new one, it's still living on borrowed time. The original design flaws from *Civilization: Call to Power* haven't been removed from the sequel, and while the sequel is more attractive and functional than its predecessor, it's still effectively the same game.

Call to Power II is an interesting take on a classic concept, but as with many reinterpretations of canonical standards, it isn't better than its source material.

—Bruce Geryk



over unit placement on the tactical screen, and that you are essentially reduced to being a spectator as the battle unfolds. Watching valuable units die because of seemingly random map placement can be frustrating.

Civilization: Call to Power was unique in that it introduced unconventional units such as the lawyer, the corporate branch, the televangelist, and other such weapons. Besides being a put-off for some players who didn't like the deviation from the military-historical theme, these units ended up unbalancing the endgame because they were so powerful. Having hordes of lawyers fight it out

Soaring Flight Sim

CRIMSON SKIES

Occasionally, games defy genre classification. That's the case with **Crimson Skies**, which could be called a flight sim, an action game, and at some points, an adventure. While games that mix genres often turn out badly, **Crimson Skies** takes the most interesting aspects of each of its source genres and puts them together into a fresh, original concept that has plenty of style. In fact, playing **Crimson Skies** can be so much fun that it'll remind you of why computer games were probably invented in the first place: to create absorbing, imaginative, alternate worlds to escape to.

Crimson Skies takes place in an alternate past in which the Great Depression caused the United States to break up into a host of regional fiefdoms engaged in constant skirmishing. Faced with the breakdown of the railway system, these nations were forced to rely on aircraft for commerce, and the skies soon became crowded with passenger and cargo traffic. As airborne trade grew, so did the menace of "air pirates". **Crimson Skies** takes you through the exploits of one such buccaneer, Nathan Zachary, as he and his cohorts gradually turn from being aerial bandits into public heroes. Along the way you'll meet the other denizens of the **Crimson Skies** universe, including rival pirates like Ulysses Boothe and several of Zachary's former love interests. It's a very rich and well-developed universe.

The world of **Crimson**

Skies is a loud, brash place. While it is ultimately a game about air combat, it's structured so that the focus is just as much on daredevil flying as it is on shooting the other guys down. To this end, you can even set up instant-action missions where the objective is stunt flying.

In keeping with **Crimson Skies**' imaginative setting, the flight models for the various aircraft are extremely forgiving. The planes allow for flashy acrobatic manoeuvres without your having to worry about concomitant airspeed, stall, and lift issues that are at the heart of any true flight simulation. The

wide variety of bizarre aircraft designs is a big part of the game—you can even customise your own—and these all have varying speed and manoeuvrability characteristics. All the planes are tremendously overpowered: no matter which plane you fly, you'll be able to climb, dive, and turn with impunity.

Crimson Skies has a 24-mission campaign that tells the story of Nathan Zachary and his band of pirate aces as they go from Hawaii to Hollywood to Manhattan in search of fame and fortune. The campaign is where the **Crimson Skies** universe really comes alive and the skill of the production team comes through. Each mission is preceded by a map-screen brief-

ing with voice-over by Nathan Zachary, in addition to dialogue supplied by his cohorts. The voice acting is simply outstanding and among the best you'll find in a computer game.

The game's graphics are excellent throughout, and they feature wonderful landscapes and clean, crisp aircraft models. The colours are bright, and the effect is in keeping with the story, as it all seems larger than life. **Crimson Skies** uses the vari-

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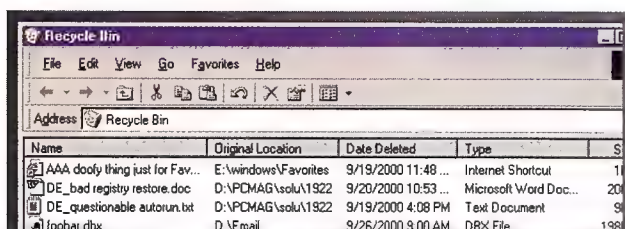
ety of locales to keep the gameplay fresh, and when combined with the story, it's enough to push you through the game without ever slowing down.

As you progress through a mission, you'll generally be instructed to do something that wasn't in the briefing, as unexpected, scripted events arise. The only problem with the campaign is that it's completely linear, so each mission will play exactly the same when repeated. This can become a bit tiresome the fifth time through a mission if you're having difficulty with a particular objective, because you'll hear all the same dialogue each time.

The game's multiplayer mode includes deathmatch,

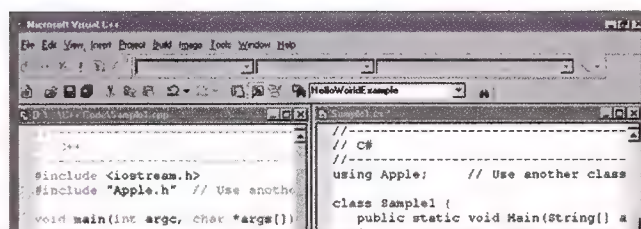
SOLUTIONS

TOOLS & TIPS FOR THE INTERNET AGE



Name	Original Location	Date Deleted	Type	Size
AAA dooly thing just for Fav...	E:\windows\Favorites	9/19/2000 11:48 ...	Internet Shortcut	11
DE_bad registry restore.doc	D:\PCMAG\tsolu\1922	9/20/2000 10:53 ...	Microsoft Word Doc...	20
DE_questionable autorun.txt	D:\PCMAG\tsolu\1922	9/19/2000 4:08 PM	Text Document	9
foobar.dbx	D:\Email	9/26/2000 9:00 AM	DBX File	198

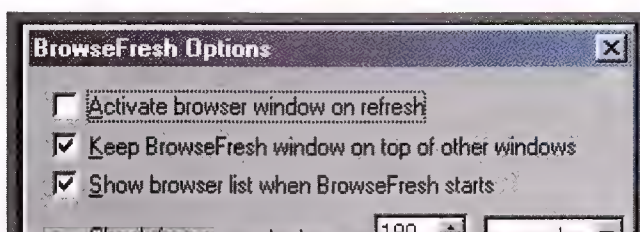
DESKTOP
Did you hit Delete when you meant Save? You have more options. **117**



```

// C#
// using Apple; // Use another class
class Sample1 {
    public static void Main(String[] a
    void main(int argc, char *argv())
    #include <iostream.h>
    #include "Apple.h" // Use anothe
  
```

PC TECH
Introducing C#, a Java-like language for Windows programmers. **119**



BrowseFresh Options

- ☐ Activate browser window on refresh
- ☒ Keep BrowseFresh window on top of other windows
- ☒ Show browser list when BrowseFresh starts

UTILITIES
With BrowseFresh, tell your browser to monitor a Web site and refresh automatically **122**



PLUS USER TO USER: PC Magazine Australia's community of experts answer readers' questions. **118**

www.pcmagazine.com.au
You'll find more articles, examples,
and code files mentioned in
this section.



Rescue the Files You Need

Did you hit Delete when you meant Save? You have more options than you think. By Neil J. Rubenking

You can almost always recover an important paper you dropped in the rubbish bin (though you may have to flatten some creases and brush off the doughnut crumbs). Even if you put the document through a shredder, sufficient effort and plenty of tape usually do the trick. On the other hand, if you needed to destroy a document so utterly that your business competitors (or a special prosecutor) wouldn't be able to recover it, you'd have to take drastic action—perhaps burn the manuscript thoroughly and scatter the ashes. For a document on disk, you have a similar set of options. When you understand how files are stored and deleted, you can recover accidentally erased files and make your deepest secrets irrecoverable.

PRIMER ON FILE STORAGE

To understand how deleted files are recovered, you need to understand how files are stored on disk. The three file systems commonly used under Windows platforms are FAT (file allocation table), FAT32 (32-bit file allocation table) and NTFS (NT File System). Under the FAT file system, every disk is divided into fixed-size clusters. The minimum cluster size is 512 bytes, and each larger size is twice the previous, to a maximum of 32KB. An index—a unique, 16-bit number—identifies each cluster. There are only 65,536 distinct 16-bit numbers, so a FAT partition can have no more than 65,536 clusters. That limitation, combined with the 32KB maximum cluster size, is the source of the 2GB limit for FAT partitions.

FAT entries link the clusters that comprise a file, and the file's directory entry includes the index of the first cluster. That cluster's FAT entry contains the index for the next cluster, and so on. The FAT entry for the file's last cluster holds a special end-of-file code (Figure 1). Unused clusters and defective clusters are marked with their own special codes. The FAT32 file system is almost the same, but clusters are smaller, and because FAT entries are 32-bit, there can be more than 4 billion, theoretically.

NTFS is a substantially more advanced file system. Its master file table (MFT) is a full-blown database that indexes every file on the disk. Each MFT entry, usually 1KB in size, records a wide variety of file information.

NTFS may store a very small file entirely within the file's MFT entry; for a larger file, the entry identifies the clusters that contain the file's data.

FILE DELETION

Regardless of the file system, when you delete a file, Windows doesn't remove the file at all, usually. Instead, the operating system moves the file's directory entry and information about the file's original location into a hidden folder that represents the Recycle Bin. The data clusters for the file aren't deleted or even moved. Only the location of the directory entry changes.

When the Recycle Bin fills up, the oldest files are truly deleted, and when you empty the bin, they're all deleted. Although you can bypass the Recycle Bin by holding down Shift when deleting a file, even then the file's data remains! Under FAT or FAT32, Windows marks the FAT entries for the file's clusters to indicate that they're available for reuse, and then marks the file's directory entry as deleted by changing the first character of the filename to a special flag character. Under NTFS, the process is similar; the file's MFT entry, directory entry, and data clusters are marked as available. The file's data remains, though, until the clusters get recycled to store some other file (Figure 2).

FILE RECOVERY

The first step toward file recovery is simple: check the Recycle Bin. Double-click the icon on your desktop and look for your file on the list that appears (Figure 3). If it's there, right-click on the file and select Restore from the pop-up menu. The sooner you do this, the better, of course. New files entering the Recycle Bin push the oldest files out.

RECYCLE BIN HELPERS

The Recycle Bin has limitations. For example, it doesn't catch files deleted from DOS programs, from other nodes on the network, or from Windows programs that don't request deletion to the Recycle Bin. Some utility programs provide a second level of protection, snagging files that the Recycle Bin misses and also hanging onto files when they leave the Recycle Bin. The Norton Protected Recycle Bin, found in Symantec's Norton Utili-

Wipe Out the Rest

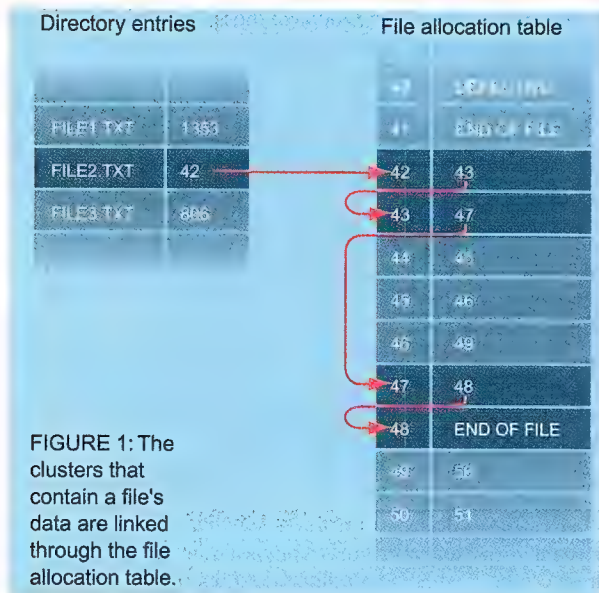


FIGURE 1: The clusters that contain a file's data are linked through the file allocation table.

can only reconstruct a file that hasn't had clusters overwritten, so it's important to avoid activity that would write to the disk. If you don't already have an undelete utility installed, try to run the utility from another node on the network or from a removable disk. Installing the utility could destroy the very file you're trying to save.

On a FAT-based file system, an undelete utility uses low-level disk access to read the deleted directory entry, extracting the index of the original first cluster of the file and the file size. The utility then attempts to locate the rest of the clusters and, if successful, asks you to supply the filename's first letter, which was wiped out by the flag character. The equivalent process under NTFS is substantially more complicated; Microsoft goes so far as to state that it is "not possible to perform an undelete under Windows NT on any of the supported file systems." (See Microsoft Knowledge Base article Q100108 for more information.) The process is indeed difficult, but not impossible. Because of this difficulty, some undelete utilities are not compati-

ties 2001, is one such program; the Fix-It Deleted Files Bin from Ontrack's Fix-It Utilities 3.0 is another. Of course, to help you, the utility must be running at the time the file is deleted.

ble with NTFS.

Norton Undelete was essential in the old DOS days; Norton Utilities 2001 provides this functionality with its UnErase Wizard. You'll also find an undelete utility in the

ROLL-BACK UTILITIES

WildFile's GoBack utility (now distributed by Adaptec) pioneered another type of file protection. GoBack takes over a chunk of each drive, using the space to record all changes to the drive. From the stored change records, you can roll back all changes, restoring the disk to its exact state as of an earlier time. If a virus wipes out your operating system or an inept employee deletes the personnel files, you can simply roll the system back to an hour ago, yesterday, or some other previous time. PowerQuest's SecondChance works in a similar fashion but stores disk changes at specified times, called checkpoints. The System Restore applet in Windows Me also lets you roll your disk back to a previously saved point.

UNDELETE UTILITIES

Even when a file has been truly deleted, you may still be able to recover the data with an undelete utility. These utilities locate and reassemble the clusters that held the file's data. Such programs

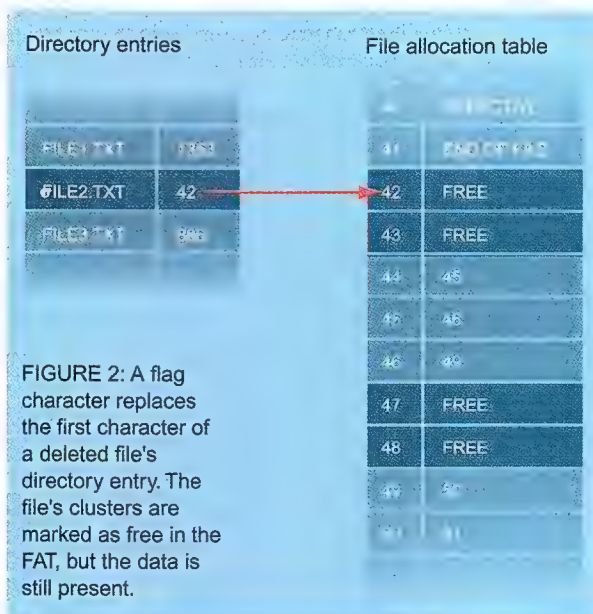


FIGURE 2: A flag character replaces the first character of a deleted file's directory entry. The file's clusters are marked as free in the FAT, but the data is still present.

Documents Opening Off-Screen

I made some display changes, and now my programs (such as Word and Excel) sometimes open with the tops of documents off the screen. This means that the title bar is off the screen as well, so I can't move the document down where it belongs. Any suggestions?

TODD HUNDLEBY
via the Internet

You can move any window using the following method. First, click on the window you want to move. This makes that window active, but if the title bar is hidden (as in your case), you won't actually see this. Next, press Alt-Spacebar, then press M. Pressing Alt-Spacebar is the same as clicking on the small document icon in the top left corner of the window. M is the menu shortcut for Move. Next, use the arrow keys to position the window wherever you want, then press Enter to drop the window into place.

—NJR

DirectX Identification

How can I tell which version of DirectX is running on my system?

ANDREA RICHARDSON
via the Internet

DirectX is a multimedia component of Windows 98 and 2000. Some software titles require a specific version of DirectX to function properly. Usually, the software will install the right version if necessary, but you may need to determine which version you're running at some point.

Use My Computer or Windows Explorer to navigate to the System folder (usually C:\Windows\System, and double-click on the application called Dxdiag (the full filename is C:\dxdiag.exe). Either the System tab or the Help tab will show the DirectX version you're running. Note that you can download the most recent version of DirectX from Microsoft (www.microsoft.com/downloads). —NJR

OFFICE SOLUTIONS

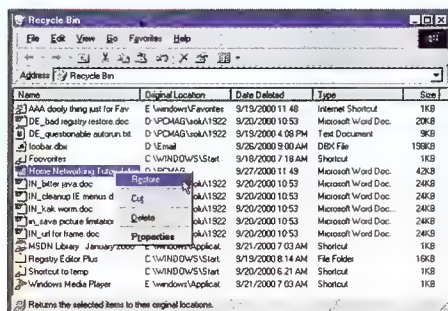


FIGURE 3: If you're lucky, the deleted file you're seeking will be found in the Recycle Bin.

Fix-It Utilities 3.0 suite from Ontrack, and in the company's more comprehensive SystemSuite 2000. All three work on FAT, FAT32, and NTFS partitions. Executive Software, maker of the popular Diskeeper defragmentation utility for NTFS, offers an NT-specific solution in Undelete 2.0.

ADVANCED DATA RECOVERY

For a file that can't be recovered by ordinary undelete utilities, there are other options available. PowerQuest's Lost & Found is designed to recover data from FAT or FAT32 partitions without even booting the operating system. Ontrack offers a free download of EasyRecovery that will recover up to five files and identify files that the full version could recover; EasyRecovery Pro adds NTFS support. If all else fails, you can contract with a data recovery service; these services can often recover data from disks that have been physically damaged by flood, fire, and so on.

Another Ontrack product, CaptureIt, can be used when a legal proceeding requires access to all the data on a particular computer. CaptureIt makes a byte-for-byte copy of the entire drive at a level below the file system. This copy can be stored on a server, digitally signed to prevent modification, and thoroughly analysed. The computer itself can remain in service, instead of being sequestered as evidence for the duration of the proceeding.

Once the disk clusters that were occupied by a deleted file have been overwritten with new data, the file is gone forever. Or is it? In fact, the old data may still be present on the magnetic media,

as a kind of wiggle in the waveforms that represent the data. Using intricate, high-tech equipment, technicians first copy the exact waveform recorded on an area of the disk, without translating the signal into bits and bytes. They then generate a perfect waveform representing the corresponding data bits, subtract the perfect waveform from the actual waveform, and amplify the differences. When successful, this process recovers the data previously stored in the specified area of the disk (Figure 4). Theoretically, you can even repeat the process, obtaining yet an earlier chunk of data. Physical limitations preclude more than seven repetitions of the recovery process. That doesn't mean you can recover seven layers of data, only that you can't recover more than seven. This level of recovery must be performed by experts, and is painstaking and expensive. In most cases, recreating the lost data from scratch is more cost-effective.

RECOVERY PREVENTION UTILITIES

Have you ever donated an old computer to a school or charity? Even if you deleted the files or formatted the disk, a bored student with computer skills could have recovered your business files or personal data. And all the encryption in the world is worthless if a deleted, plain-text copy of a secret document is lying around on the system. That's why, just as utilities exist to recover files lost accidentally, others exist to prevent recovery. Because recovering data that has been overwritten seven times is physically impossible, that's just what these utilities do. They overwrite the file's data area with different patterns of bits (all 1s, all 0s, alternating, random, and so on) before deleting the file. The Wipe Info module in Norton Utilities 2001 handles this task, as does the Shredder module in the Gizmos Mega-Pak from Play. Ontrack's DataEraser and PowerQuest's DataGone are designed to wipe an entire disk. Some utilities will also scan the disk and overwrite every cluster that's marked as not in use.

You're now a file-deletion expert. You can recover your own files and you know how to prevent a hacker (or a hot-shot lawyer) from recovering the files you want to stay buried.

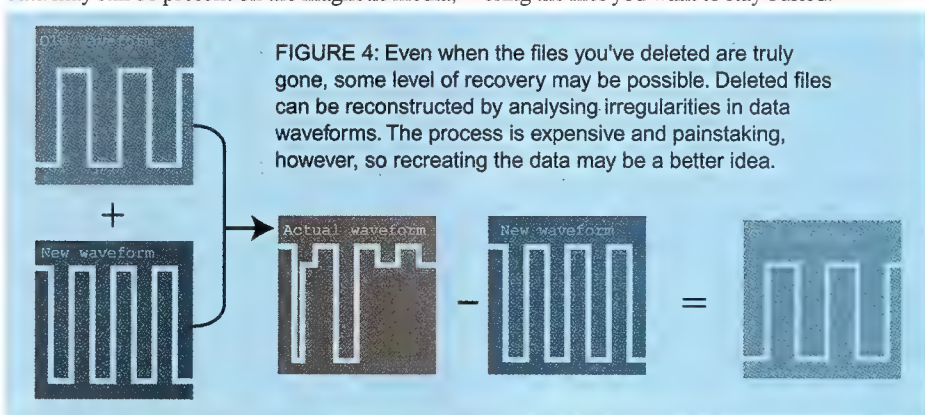


FIGURE 4: Even when the files you've deleted are truly gone, some level of recovery may be possible. Deleted files can be reconstructed by analysing irregularities in data waveforms. The process is expensive and painstaking, however, so recreating the data may be a better idea.

Music to Your Ears?

Introducing C#, a Java-like language for Windows programmers.

By Rich Dragan

Eschewing Sun's immensely popular Java language—and the endless coffee-based puns—Microsoft decided to leverage its own C++ expertise (and borrow a musical term) to produce its newest programming language, C# (C sharp). C# aims to be what Java already is—a better and simpler C++, one backed by powerful component libraries. (In fact, C# was actually used to build these libraries, a set of robust application frameworks known as the .NET Framework.) Microsoft is also betting that C# will take on a life of its own with developers who want to bring their C++ skills into the Web development arena, previously the domain of languages such as VBScript, Perl and Java.

In many ways C# does resemble Java. Foremost among C#'s features is one dear to the hearts of Java developers—garbage collection. Memory leaks—the difficult-to-detect erosion of memory resources over time—have long been the bane of traditional C/C++ development. C#, like Java, takes the responsibility for proper memory management out of the hands of developers and turns the task over to the system. Objects that are not in scope can be cleaned up automatically. Though writing bloated code that keeps eating up memory forever is still possible, garbage collection makes robust applications much easier to write. But unlike Java, C# retains C++'s destructors (the built-in clean-up functions for classes) as part of the language, although it invokes them automatically and C++ doesn't.

Neither C# nor Java include C++'s multiple-implementation inheritance, a capability that was always somewhat controversial among the experts. Both C# and Java let you implement more than one interface at a time in new classes, though, so you can simulate multiple inheritance in an arguably less error-prone fashion.

If you have ever programmed in C or C++, you know that one of the most powerful features in both is also potentially dangerous for developers. C and C++ pointers let you access and modify memory directly. A product of the days when every byte counted, pointers let programmers get down to a low level of memory management and perform all sorts of tricks for efficiency. With this flexibility comes danger, of course; applications can modify memory locations they have no right to mod-

ify. C#, like Java, disguises pointers as references. (This just means that anytime you work with an object in C#, you'll be using a reference, not a pointer.) C# also makes using references safer by preventing improper typecasts and checking parameters associated with all methods. With C#'s type safety, it's all but impossible to create an invalid reference. As with Java, you will normally use the new operator to assign a reference to a live object. C# does let pointerlike abilities creep back into the language with keywords like `ref` that let C# developers gain the convenience of pointers manually.

As in Java, everything in C# is an object. (Everything, that is, except the so-called primitive types—`int`, `long`, `float`, `double`, and so forth.) Also as in Java, you cannot have global variables outside classes, unlike C and C++. The result is a language without some of the flexibility of C++, perhaps, but that's simpler to code and use—a truly object-oriented language that lends itself to a safer, more robust programming style.

C# AND COM

Visual Basic developers have had an easier time programming Microsoft COM+ objects than have C++ programmers, who have had to cope with the specifics of creating, managing, and cleaning up these objects. C#, like VB, manages COM+ objects for you, hiding the particulars. (Don't worry, if you're a C++/COM+ guru and absolutely need to get to an IUnknown interface, you can.) Most of us will appreciate getting away from such detail. At least, that's Microsoft's bet. C# should make dealing with the thornier aspects of COM+ a thing of the past—just as it has been with VB developers for several years now. (See Figure 1 and Figure 2 for a comparison of COM+ syntax for C++, VB, and C#.)

REUSABLE SKILLS

In recent years C++ has developed into a niche language. Aside from CGI scripts or ISAPI/NSAPI filters, C++ has no obvious place on a Web server (except, of course, if you are building a browser or Web server from scratch). For generating Web content dynamically, you're much more likely to use VBScript, JavaScript, Java (and the JSP—JavaServer Pages—standard), Perl, or the Perl Hypertext Preprocessor, commonly called PHP. On the Windows plat-

Password Protection In a Batch File

I want to add a password prompt to a simple batch file. The prompt should ask users for a three-character password before executing the rest of the batch file. Can you tell me how to do this?

HAROLD HARRIS
via the Internet

Save the following text as `Getkey.scr`, making sure to include the blank lines before `RCX` and after `Q`:

N GETKEY.COM

A 100

MOV AH,0

INT 16

MOV AH,4C

INT 21

RCX

8

W

Q

Now enter the command `Debug<Getkey.scr` to create `Getkey.com`. Put `Getkey.com` in a folder on your path. `Getkey` waits for a keystroke and returns the corresponding ASCII code. The following batch file uses `Getkey` to detect the password `AOK` (case-sensitive).

@ECHO OFF

:Top

ECHO Enter password.

SET K=

GETKEY

IF ERRORLEVEL 66 GOTO Not1

IF ERRORLEVEL 65 SET K=%K%x

:Not1

ECHO *

GETKEY

IF ERRORLEVEL 80 GOTO Not2

IF ERRORLEVEL 79 SET K=%K%q

:Not2

ECHO **

GETKEY

IF ERRORLEVEL 108 GOTO Not3

IF ERRORLEVEL 107 SET K=%K%j

:Not3

ECHO ***

IF '%K%'=='xqj' GOTO OK

GOTO Top

:OK

ECHO Password OK.

Consult an ASCII table and change the numbers to select a different password.

—Neil J. Rubenking

Eliminating Duplicate DLLs

As I search for duplicate files on my Windows 98 system I often find duplicate DLLs. Is there a common directory where I can keep only one copy of each DLL? I'd like to use C:/Windows/System. Is there any downside to this strategy?

FRANCIS DE REGNAUCOURT
via the Internet

C:/Windows/System is the correct location for shared DLLs. If you find duplicates that are identical, you can delete all but the copy in C:/Windows/System (move a copy there if necessary). Now run all of the applications found in the folders that contained duplicates. If one of them fails, copy the DLL back into that application's folder.

If the DLLs are not identical, move the newest DLL into C:/Windows/System and the rest into the Recycle Bin. Determine the newest files by checking the version numbers, if available, or the file date/time if not. Now run each application that resides in the folder where a copy of the DLL was found. If one of them fails, just restore its particular copy of the DLL from the Recycle Bin.

—NJR

Restoring a Lost Rundll32.exe

I accidentally deleted the rundll32.exe file and now many functions and programs refuse to work. How do I get it back?

MATHEW WALKER
via the Internet

Rundll32.exe is an essential Windows file, used internally to activate a wide variety of system functions, from formatting floppy disks to handling Open with... on the right-click pop-up menu. If the file is missing or corrupted, you'll have big problems. To recover, put your original Windows CD in the CD-ROM drive, open an MS-DOS prompt, and navigate to the folder on the CD-ROM that contains the setup .cab files. These will be files with sequentially numbered names like

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form, C++ was reserved for building the fastest and smallest Web components (through the Active Template Library), which could then be scripted with Visual Basic. (Chances are no project leader interested in keeping a job would pitch developing an entire Web application in C++.)

With C#, however, your C++ skills get a new lease on life, because you can use the new language to build whole Web applications. You can now choose C# for projects where once VB or VBScript would have been the only options, given the realities of today's ever-tighter development cycles. C# will let you leverage your C++ skills to write reusable components even more quickly. In fact, Microsoft expects C# to fuel a surging third-party market offering components for server-side processing.

THE .NET FRAMEWORK

There are plenty of good reasons to choose C# over C++, but as with Java, the real strength of this language derives from the underlying application frameworks (hundreds of reusable components and APIs) that are a part of Microsoft's new .NET Framework. Java itself,

initially touted for its simplicity, has undergone a pretty astounding evolution. The language per se might still be simple enough, but the classes behind the current Java 2 Enterprise Edition (J2EE) now number over 2000, with more than 24,000 properties and methods for programmers to choose from. Microsoft's .NET Framework is still under development, but you can already see a similar level of complexity. You can expect a robust set of objects and APIs that will continue to grow.

One of the most interesting things about the .NET Framework is that developers will be able to program clients as well as servers using the same set of APIs. Basically, this so-called Personal Tier means you can mimic server-side features in your standalone client code. You could, for example, create a local Web server. For building user interfaces outside a browser, it looks like the .NET Framework will rely primarily on Windows Forms, a new, easy-to-use API for creating and managing windows. Microsoft's Common Language

Runtime (which includes the .NET Framework and Windows Forms) appears to be the designated heir to the Microsoft Foundation Classes (MFC), a true greybeard in the business, having been around since the early 1990s. Don't worry about distributing a much larger set of files with your applications, though. This runtime will be a part of an update to Windows and will not have to be shipped in custom software.

LANGUAGE INDEPENDENCE

If we haven't convinced you yet that Java and C# have a lot in common, take a look at what's next. C# (and the upcoming Visual Basic) will generate code that will execute on a kind of virtual machine running on the Windows operating system. Yes, C# code compiles to an intermediate language (IL), which gets

interpreted (and optimised) on a runtime engine. Those familiar with the way Java works will remember that Java compilers generate platform-independent bytecode that is turned into native code when run on a particular virtual machine.

Despite today's Java VMs, which run on all kinds of platforms, expect the .NET Framework

to stick with Windows. Eventually, in the post-PC era we hear so much about lately, this should broaden beyond support for Windows 95, 98, Me, NT, and 2000 to include a subset of this powerful API running on smaller devices.

Until now, programmers relied on a C API to get at different flavours of Windows. With the arrival of the .NET Framework, programmers can finally rely on objects to talk to the underlying operating system. Of course, you'll still be able to go under the hood to get at the old Win32 C API. Particularly on the server-side, though, this new programming paradigm will let you use objects more easily than ever before.

Besides C#, the .NET Framework bundles a host of notable improvements, such as ASP+ (which may be renamed to ASP.NET by the time you read this), for better component reuse in Web applications, ADO.NET for simplifying data access, and better versioning control for taming the DLL hell of traditional Windows deployment. There's also a Virtual Object System (VOS), which facili-

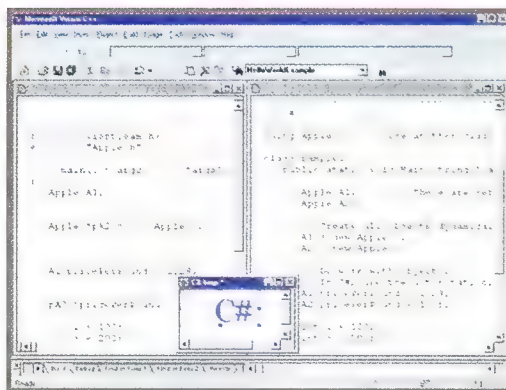


FIGURE 1: A better C++? A side-by-side comparison of the source code for a simple program written in C++ and the new C#, which smoothes out the rough edges of C++ while borrowing a good deal of its syntax.

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tates supporting of data types and objects from whatever language you write code in.

MANY LANGUAGES, ONE PLATFORM

Language interoperability is a real strength of the .NET Framework. In fact, you never have to use C# if you don't want. You can just as easily use Visual Basic 7 (and even C++, through a technique called Managed C++). Microsoft is working with other vendors to ensure the .NET Framework gets supported by a wide variety of languages through the company's Common Language Specification (CLS), a publicly available standard that defines how other languages should implement framework features.

That's the biggest philosophical split with Java in the new Microsoft vision for programming, and arguably one of the chief advantages. Java is both a language and a run-time platform, but C# will be just one choice among many for getting to the .NET Framework run-time engine. The real question (as we see it) is which vendor will be the first to come up with a Java compiler that targets the .NET Framework. Probably not Microsoft, given the recent legal entanglements with Sun, but the language interoperability of the .NET Framework makes this development likely. In the meantime, C# looks to be the slickest way to program with the new .NET Framework. Even if the language doesn't catch on with developers, though, the underlying platform can still survive and prosper.

Not that this newcomer doesn't have a steep hill to climb to win developer mindshare. Java has generated considerable buzz in just four years, and another programming language succeeding so well so quickly is hard to see. After all, Java is something of a record-breaker for quick adoption by programmers worldwide. In fact, seeing C# as a direct competitor to Java is hard, given that Java has all but won the battle for supremacy in the hearts of developers in the cross-platform enterprise space. But expect C# to be an attractive and powerful option for many

```
//-----
// C#- Easy syntax, automatic cleanup.
//-----
TrafficLight MyLight;
MyLight = new TrafficLight();
bool bResult;
try {
    MyLight.SetGreen(true);
    MyLight.StartTimer(5000);
}
catch(Exception e) {
    // Error handling goes here.
}
// Automatic clean-up when MyLight goes out of scope.

'-----
' Visual Basic - Easy syntax, easy cleanup.
'-----
Dim MyLight as TrafficLight
Set MyLight = CreateObject("TrafficLight")

MyLight.SetGreen(True)
MyLight.StartTimer(5000);

Set MyLight = Nothing // Easy clean-up.

//-----
// C++ - Complicated syntax, manual cleanup
//-----
ITrafficLight *pMyLight = NULL;
HRESULT hr = CoCreateInstance(__uuidof(ITrafficLight),
    NULL, CLSCTX_ALL, __uuidof(ITrafficLight),
    reinterpret_cast(void **)&pMyLight);
if(SUCCEEDED(hr))
{
    pMyLight->SetGreen(TRUE);
    pMyLight->StartTimer(5000);
    pMyLight->Release(); // Manual clean-up.
}
```

FIGURE 2: This simple example illustrates using a COM+ object in C#, Visual Basic and C++. (Assume TrafficLight is a COM+ object.)

Windows Web developers. And even if C# does not soar, you should be able to use your language of choice with Microsoft's .NET Framework.

Microsoft sources were unable to predict when the .NET Framework and Visual Studio .NET would ship, but a good bet is sometime in 2001—later rather than earlier. Microsoft is planning to release Beta 1 of Visual Studio.NET. In the meantime, judging by the technical preview we looked at, the .NET Framework provides the real advance for developers, by exposing a rich set of APIs and objects on both servers and clients.

Whether you program, manage programmers, or simply need to keep apprised of the latest developments, you'll want to keep track of C#. Both the language and its underlying platform are worth watching in the upcoming months.

Win98_21.cab, Win98_22.cab, and so forth. Within that directory, determine the first CAB file name in numerical sequence. Now enter the command EXTRACT/LC:\Windows /A win98_21.cab rundll32.exe, replacing Win98_21.cab with the actual lowest-numbered CAB file name. This will extract a fresh copy of Rundll32.exe and put this essential file directly into your Windows folder.

—NJR

DOSKEY Everywhere

I am always opening DOS prompts on my Windows 95 machine in different ways: from the Start menu, from an icon on the desktop, using one of Microsoft's PowerToys, and so forth. I'd like to be able to use DOSKEY in every DOS window, but since Doskey.com is useless in the GUI, I don't think I should add the program to my Autoexec.bat. Is there a way I can load DOSKEY automatically when I open a command prompt, regardless of the method I use?

MICHAEL BAUMINGER
via the Internet

I'd be lost without the DOSKEY-provided ability to scroll back through recent commands, and I rely on DOSKEY macros to the point that I sometimes forget they aren't built-in commands. Adding DOSKEY to Autoexec.bat is by far the simplest solution, especially given your various methods for launching MS-DOS prompts.

You can see for yourself that DOSKEY is quite tiny. Next time you're at an MS-DOS prompt with DOSKEY running, enter MEM /M DOSKEY to see how much memory is allotted. It should be under 5KB, unless you've used the /BUFSIZE switch to substantially enlarge the macro buffer.

—NJR

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No More Clicking Refresh

Tell your browser to monitor a Web site and refresh automatically.

By Don Metzler

Many Web sites feature content that updates frequently—stock quotes, sports scores, news headlines, or messages posted on Web forums, for example. BrowseFresh, our latest utility, checks whether the Web site you're viewing in Internet Explorer has changed. If so, the utility refreshes your browser window automatically.

Typically, you have to click your browser's Refresh button to see whether new information has been posted to the page you're viewing. If nothing's changed, you will have refreshed unnecessarily.

Wait too long between refreshes, on the other

hand, and you won't see the new information right away. You may even miss something important. BrowseFresh refreshes your browser automatically, but only when necessary. Options let you control how frequently to check for updates and whether refreshed browser windows should be activated.

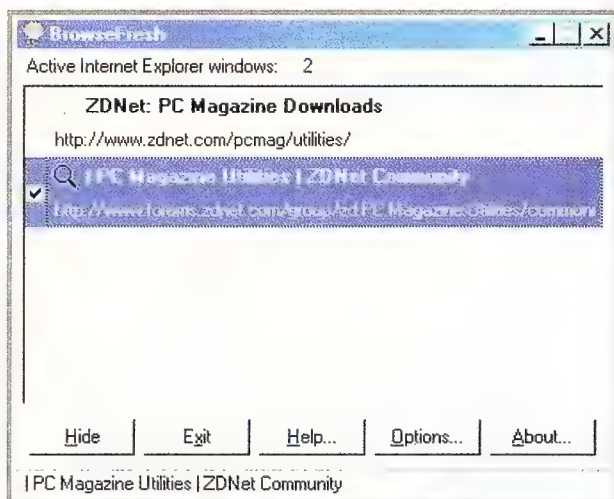
BrowseFresh runs under all 32-bit Windows platforms and requires Internet Explorer 4 or later. An article about how to use BrowseFresh and how the program was written is available on our Web site at www.pcmagazine.com.au. You'll also find a link for downloading the utility and its source code there.

HOW TO GET THE FILES

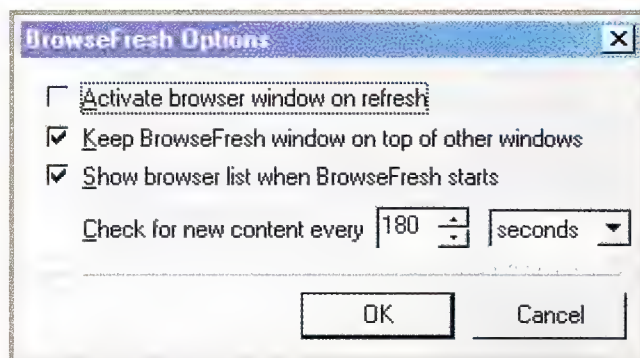
PC Magazine Australia utilities are available on the Internet.

Via the Internet: For Utilities, go to www.pcmagazine.com.au. Then click on Downloads, enter BrowseFresh in the search window and click Go!

The programs presented in PC Magazine are copyrighted and can not be distributed, whether modified or unmodified. Use of the programs is subject to the terms and conditions of the license agreement distributed with the programs.



- 1 The BrowseFresh main window lists all the browser windows open on your system. To have BrowseFresh automatically refresh a browser window, simply select the check box next to that window's listing.



- 2 The BrowseFresh Options dialog lets you control how frequently the program checks for fresh content. Other options let you activate refreshed browser windows, keep the browser list on top, and show the browser list when BrowseFresh first starts.



- 3 BrowseFresh is a tray application that appears as a flower icon when idle. The icon's context menu lets you invoke the browser list window or the Options dialog, or view the online help files.



- 4 When BrowseFresh is checking for new content, the tray icon changes and becomes animated. The red circle revolves around the e until the check completes.

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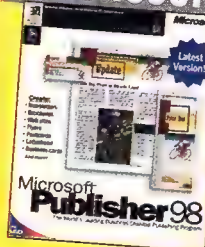
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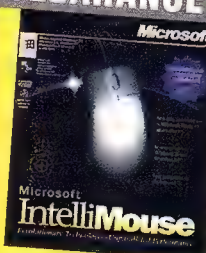
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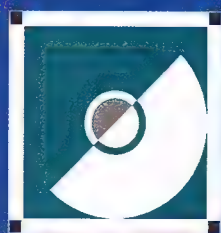
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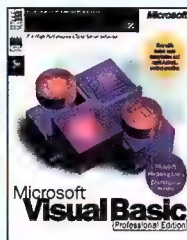
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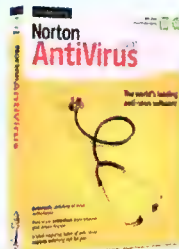
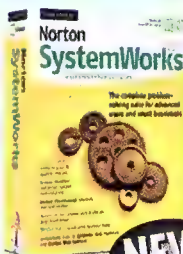
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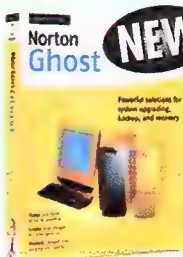


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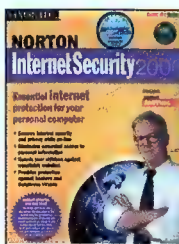
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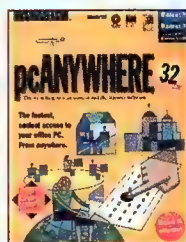
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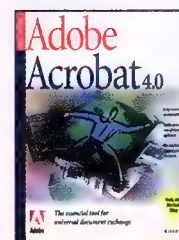
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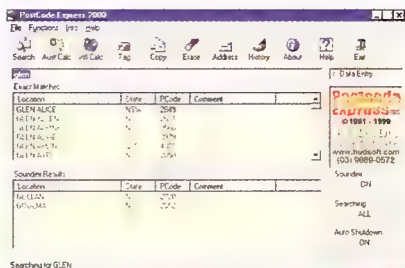
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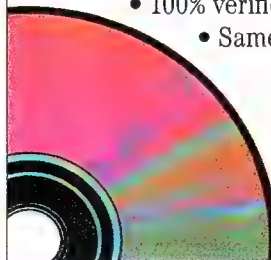
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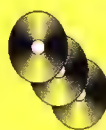
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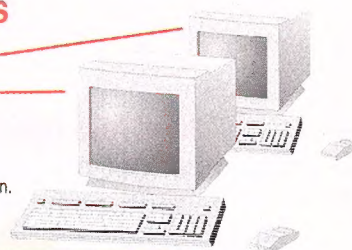
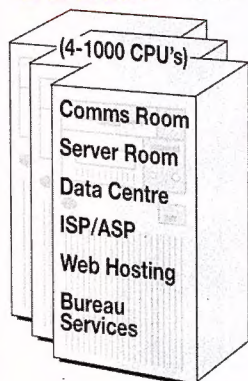
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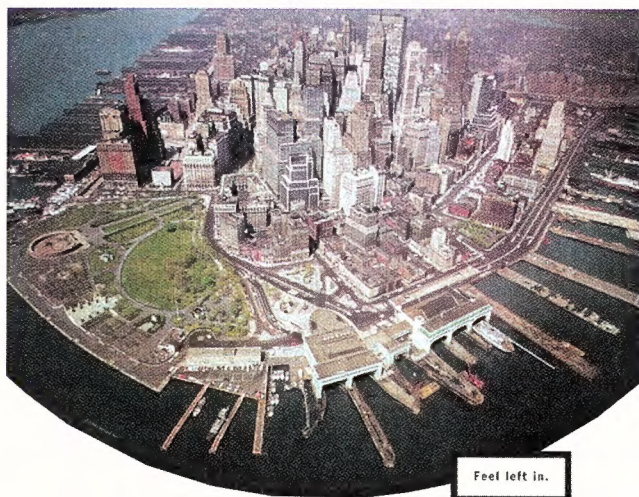
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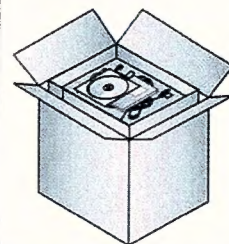
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This US Yahoo! Finance ad is a trip in the wayback machine. Our Manhattan architecture experts tell us the photo is circa 1960. Notice the glaring absence of the World Trade Center.

a Open the carton.



Step number 1 from the HP Office-Jet G85 quick-start guide. Looks like we're off to a quick start!

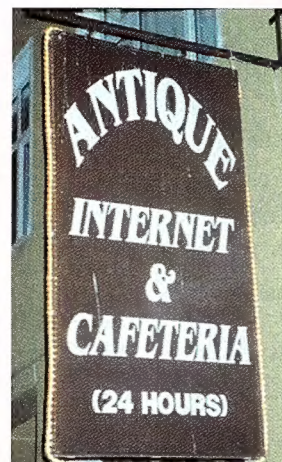


Instead of free developing, can we have a bigger hard drive instead?
(Camera store ad)

Features Advanced "AIM-AND-SHOOT" Technology!
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Picture-perfect photos? Well, we certainly hope so! (Talk.com promotion)

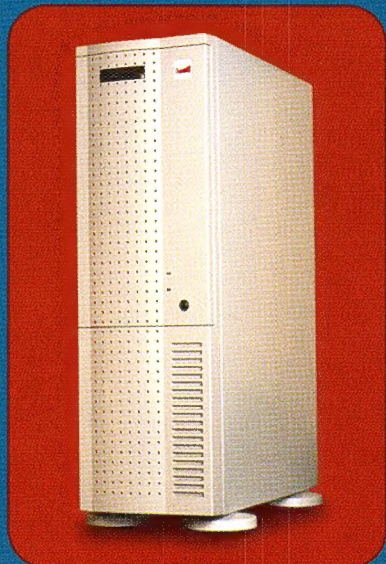
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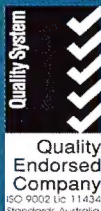
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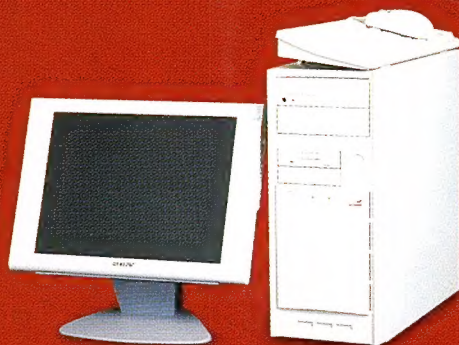
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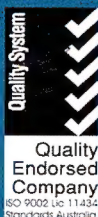


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